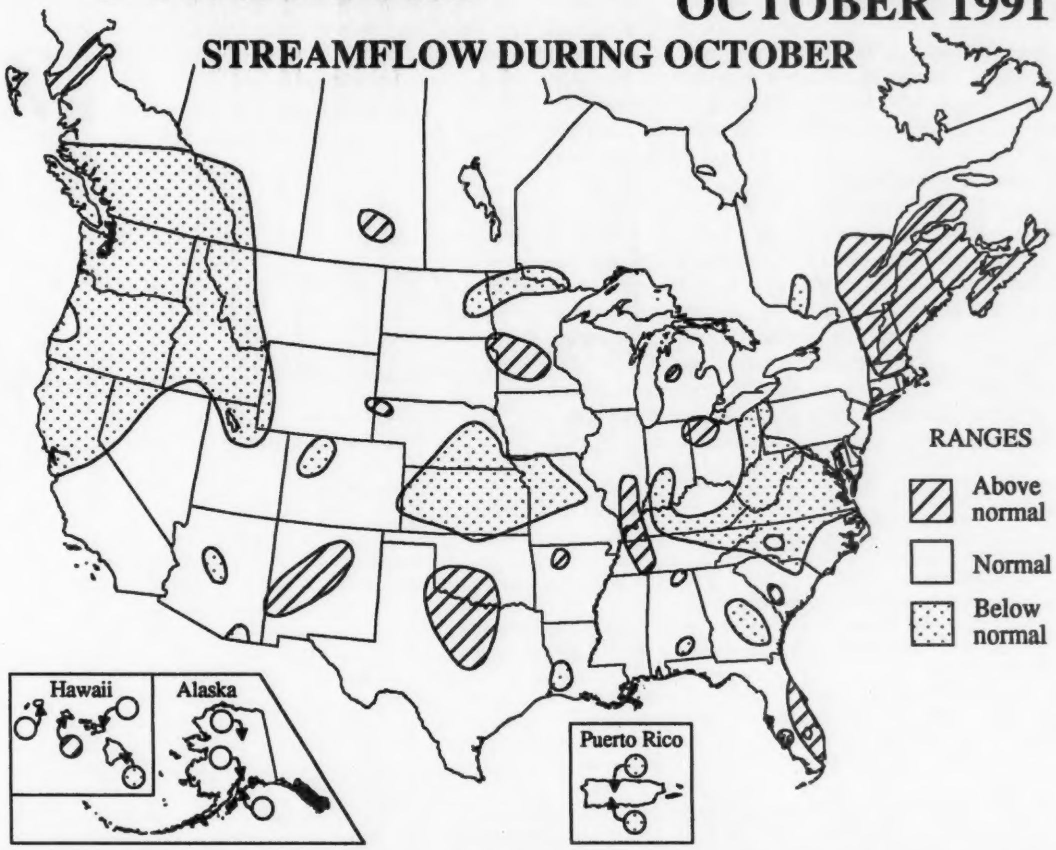
National Water Conditions

UNITED STATES
Department of the Interior
Geological Survey

CANADA
Department of the Environment
Water Resources Branch

OCTOBER 1991

STREAMFLOW DURING OCTOBER



October streamflow declined from that for September at 59 percent of the index stations. Drought continued to affect parts of the United States and southern Canada, with the contents of the New York City Reservoir System continuing to decline, and California total streamflow, reservoir contents, and ground-water levels continuing well-below average.

Streamflow was in the normal to above-normal range at 70 percent of the 191 index stations in the United States, southern Canada, and Puerto Rico during October. Below-normal range streamflow occurred in 23 percent of the area of the conterminous United States and southern Canada during October. Total October flow for the 173 reporting index stations in the conterminous United States and southern Canada was 2 percent above median, after a 3 percent increase from last month.

The combined flow of the 3 largest rivers in the lower 48 States—Mississippi, St. Lawrence, and Columbia—averaged 18 percent below median and in the below-normal range, after a 10 percent decrease in flow from September to October. Flow of the St. Lawrence River was in the normal range for the fifth consecutive month. Flow of the Mississippi River was in the below-normal range after three months in the normal range. Flow of the Columbia River was in the below-normal range for the second consecutive month and the third lowest of record.

Month-end index reservoir contents were in the below-average range at 33 of 100 reporting sites. Contents were in the above-average range at 38 reservoirs.

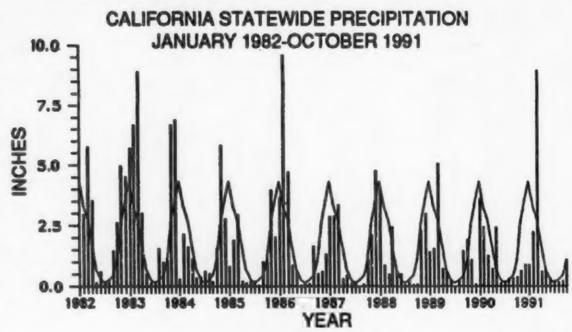
Mean October elevations at four master gages on the Great Lakes (provisional National Ocean Service data) were below median on all of the lakes and in the below-normal range on Lake Ontario. Levels fell from those for September on all the lakes.

Utah's Great Salt Lake fell to 4,201.40 feet above National Geodetic Vertical Datum. Lake level was 1.00 foot lower than at the end of October 1990, and 10.45 feet lower than the maximum of record which occurred in June 1986 and March-April 1987.

Streamflow was below median in the Hudson Bay, Missouri River, Ohio River, Colorado River, the Great and other closed, and Columbia River basins, and at or above median in the other basins. October streamflow increased from that for September only in the Hudson Bay, St. Lawrence River, Atlantic Slope, and Columbia River basins, and decreased from that for last month in the other basins.

SURFACE-WATER CONDITIONS DURING OCTOBER 1991

October streamflow declined from that for September at 112 index stations, remained unchanged at 1 index station, and increased at 78 index stations. (Data for the North Fork American River at North Fork Dam, California, were not available.) Drought continued to affect parts of the United States and southern Canada, with the largest areas of below-normal range streamflow located in the West, the central Midwest and east central United States. The contents of the New York City Reservoir System continued to decline, falling from 52 percent of capacity at the end of September to 48 percent of capacity (only 70 percent of the long-term average for the end of October) at the end of October. In California, total streamflow, reservoir contents, and ground-water levels remained well-below average. Total streamflow for October at the six index stations in California was 28 percent below median despite a Statewide average precipitation (*California Water Supply Outlook*) of 20 percent above normal. The persistence and severity of the drought in California is shown by the following: (1) since the end of October 1990 (the most recent month of above-median streamflow), the cumulative streamflow deficit at the six index stations has gone from about 68 percent of a median year of runoff to about 112 percent of a median year of runoff—about 44 percent of a median year of runoff was "lost" in the last 12 months; (2) the seasonal lows in combined storage for six large index reservoirs have generally declined steadily since 1986, bottoming out at 69, 53, 43, 45, and 33 percent of capacity, with combined storage currently at 32 percent of capacity and the beginning of winter precipitation about a month away. According to the *Climate Variations Bulletin* (National Climatic Data Center, NOAA), California statewide precipitation for late spring to early fall 1991 has consistently averaged near or slightly below normal for the state. This has caused the monthly Palmer index values to drop out of the severe drought category, however long-term conditions are still severely dry due to large moisture deficits during the last five winter rainy seasons. Monthly precipitation for January 1982 through October 1991 is shown in the graph below.



(Continued on page 4)

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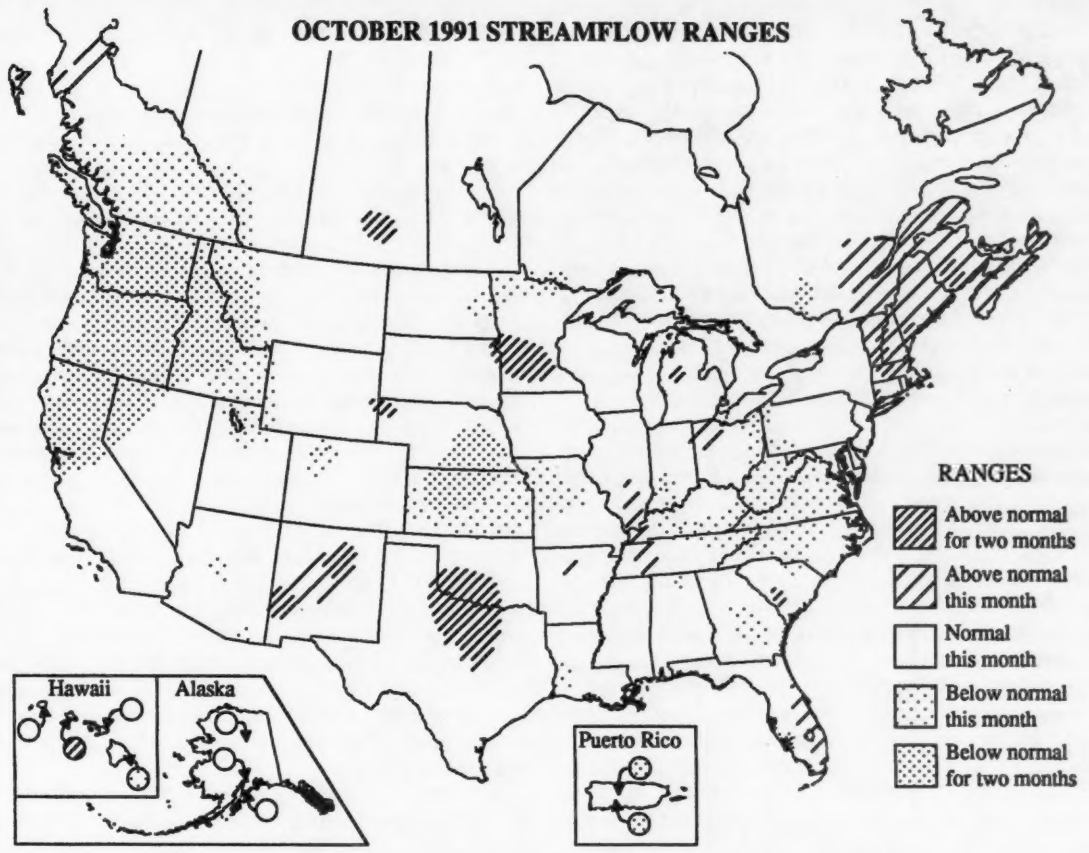
OCTOBER 1991 STREAMFLOW RANGES



SUMMARY OF OCTOBER 1991 STREAMFLOW FLOW RANGES

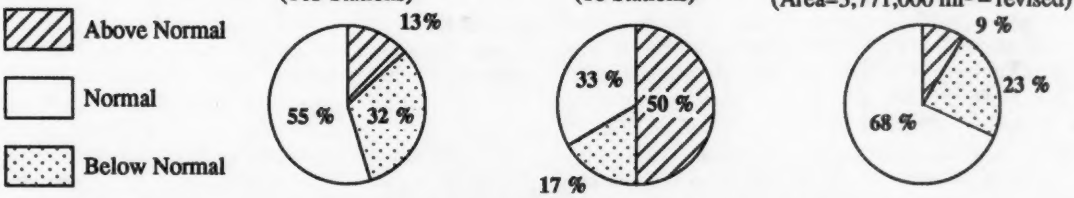
By Conditions at Individual Index Stations

Conterminous United States (163 Stations)

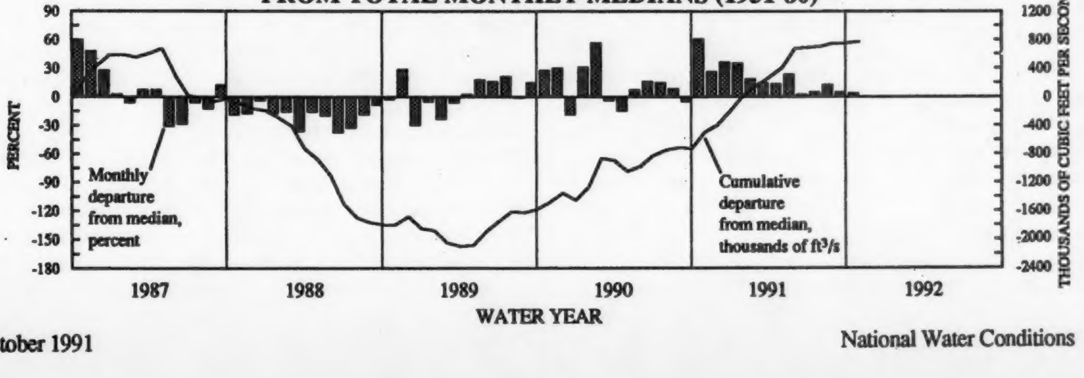
Southern Canada (18 Stations)

By Total Area

Conterminous United States and southern Canada (Area=3,771,000 mi^2 – revised)



MONTHLY AND CUMULATIVE DEPARTURE OF TOTAL MONTHLY MEANS FROM TOTAL MONTHLY MEDIANS (1951-80)



Streamflow was in the normal to above-normal range at 70 percent of the 191 index stations in the United States, southern Canada, and Puerto Rico during October, compared with 77 percent of stations in those ranges during September, and 83 percent of stations in those ranges during October 1990. Below-normal range streamflow occurred in 23 percent of the area of the conterminous United States and southern Canada during October, compared with 15 percent during September (revised, see page 22), and 22 percent (revised, see page 22) during October 1990. Total October flow of 383,900 cubic feet per second (ft^3/s) for the 173 reporting index stations in the conterminous United States and southern Canada was 2 percent above median, after a 3 percent increase from last month, and 36 percent less than flow during October 1990.

Only one new extreme—a low on the Little Blue River near Barnes, Kansas (33 years of record)—occurred at streamflow index stations, compared with 3 lows and 2 highs during September. The monthly mean of 49.2 ft^3/s was 80 percent below median for the month and 41 percent below the previous October low, which occurred in 1956. A new low for the daily mean for the month also occurred: 34.0 ft^3/s on October 1, 15 percent below the previous daily low for the month, which also occurred in 1956. Hydrographs for the Little Blue River near Barnes and six other stations (all with monthly means in either the below- or above-normal ranges) are on page 5. The other hydrographs are for the Skykomish River near Gold Bar, Washington, at which the monthly mean was 78 percent below median; Verde River below Tangle Creek, above Horseshoe Dam, Arizona, at which the monthly mean was 22 percent below median and the second lowest of October record; Crow River at Rockford, Minnesota, at which the monthly mean was 1,290 percent above median and the third highest of October record; Muskegon River at Evart, Michigan, at which the monthly mean was 159 percent above median and the second highest of October record; Peace River at Arcadia, Florida, at which the monthly mean was 62 percent below median; Rappahannock River at Remington, Virginia, at which the monthly mean was 85 percent below median and the third lowest of October record.

The combined flow of the 3 largest rivers in the lower 48 States—Mississippi, St. Lawrence, and Columbia—averaged 521,400 ft^3/s; 18 percent below median and in the below-normal range, after a 10 percent decrease in flow from September to October. Flow of the St. Lawrence River was in the normal range for the fifth consecutive month. Flow of the Mississippi River was in the below-normal range after three months in the normal range. Flow of the Columbia River was in the below-normal range for the second consecutive month and the third lowest of record. Hydrographs for both the combined and individual flows of the "Big 3" are on page 6. Dissolved solids and water temperatures at five large river stations are also given on page 6. Flow data for the "Big 3" and 42 other large rivers are given in the Flow of Large Rivers table on page 7.

Month-end index reservoir contents were in the below-average range (below the month-end average for the period of record by more than 5 percent of normal maximum contents) at 33 of 100 reporting sites, compared with 29 of 99 (data were not available for the Nova Scotia system) at the end of September, and 40 of 100 at the end of October 1990, including most reservoirs in New Jersey, Pennsylvania, Maryland, Nebraska, the Dakotas, Montana, Idaho, Wyoming, Utah, Nevada, and California. Contents were in the above-average range at 38 reservoirs (compared with 41 last month), including most reservoirs in Nova Scotia, Maine, New Hampshire, Vermont, the Carolinas, Georgia, Alabama, the Tennessee Valley, Oklahoma, Texas, and Arizona. Reservoirs with contents in the below-average range and significantly lower than last year (with normal maximum contents of at least 1,000,000 acre-feet) are: the New York City Reservoir System, New York; Allegheny, Pennsylvania; Boise River, Idaho; and Clair Engle Lake and Shasta Lake, California. Four reservoirs had less than 10 percent of normal maximum contents (October average in parentheses): John Martin, Colorado, 2 percent (16); Pine Flat, California 5 percent (36); Lake Tahoe, California-Nevada, 0 percent (47); and Rye Patch, Nevada, 1 percent (48). Graphs of contents for seven reservoirs are shown on page 8 with contents for the 100 reporting reservoirs given on page 9. Maps on page 11 show reservoir storage conditions for October 1991 and October 1990 on the streamflow maps for those months.

Mean October elevations at four master gages on the Great Lakes (provisional National Ocean Service data) were below median on all of the lakes, at the boundary of the below-normal range on Lake Superior and in the below-normal range on Lake Ontario. Levels fell from those for September on all the lakes. October levels ranged from 0.03 (Lake Superior) to 0.54 foot (Lake Erie) lower than those for September. Monthly means have now been in the normal range for 7 months on Lake Erie and 17 months on Lake Huron. The monthly mean for Lake Superior was in normal range after a below-normal range September. Monthly means have been in the below-normal range on Lake Ontario for the last two months. October 1991 levels ranged from 0.66 foot lower (Lake Erie) to 0.13 foot higher (Lake Superior) than those for October 1990. Stage hydrographs for the master gages on Lake Superior, Lake Huron, Lake Erie, and Lake Ontario are on page 10.

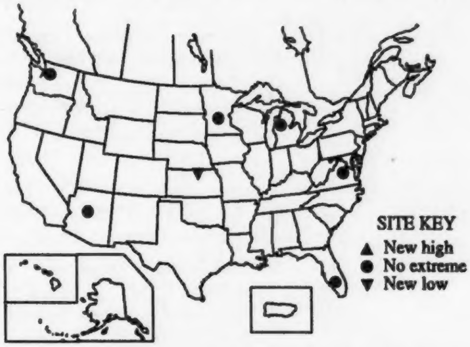
Utah's Great Salt Lake (graph on page 10) fell 0.10 foot during October 1-15, then remained at that level through the end of the month — 4,201.40 feet above National Geodetic Vertical Datum (NGVD). Lake level was 1.00 foot lower than at the end of October 1990, and 10.45 feet lower than the maximum of record which occurred in June 1986 and March-April 1987.

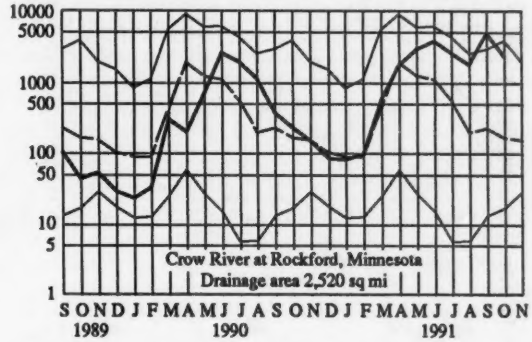
Maps on page 11 show streamflow conditions for October 1991 and October 1990. October 1991 has about 57 percent less area in the above-normal range, about 5 percent more area in the below-normal range, and about 21 percent more area in the normal range than October 1990. The distribution of area in the flow ranges is also dissimilar for the two months. Below-normal range streamflow occurred during both months in parts of British Columbia, Washington, Oregon, California, Nevada, Utah, Idaho, Montana, North Dakota, Minnesota, Nebraska, Kansas, Louisiana, Alabama, Georgia, and Florida. Above-normal range streamflow occurred during both months in parts of Saskatchewan, Quebec, New Brunswick, Nova Scotia, Maine, New Hampshire, Vermont, New York, Illinois, New Mexico, and Hawaii. Both maps also show reservoir storage at all index reservoir stations for comparison with streamflow.

Graphs for 12 hydrologic areas show monthly percent departure of streamflow from median for the 1987-92 water years to date (page 12) and also compare monthly streamflow for the 1991 and 1992 water years with median monthly streamflow for 1951-80 (page 13). Streamflow was below median in the Hudson Bay, Missouri River, Ohio River, Colorado River, the Great and other closed, and Columbia River basins, and at or above median in the other basins. Streamflow increased from that for September only in the Hudson Bay, St. Lawrence River, Atlantic Slope, and Columbia River basins, and decreased from that for last month in the other basins.

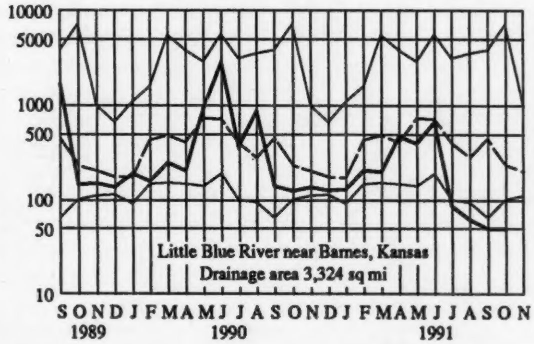
MONTHLY MEAN DISCHARGE OF SELECTED STREAMS

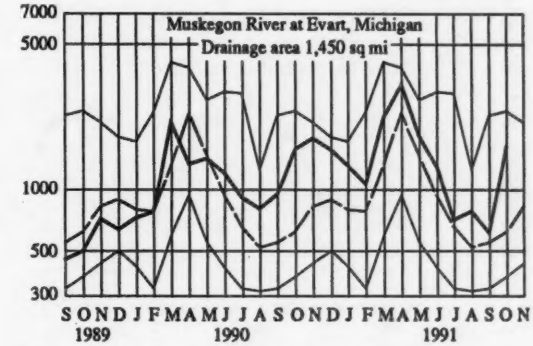
Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period.

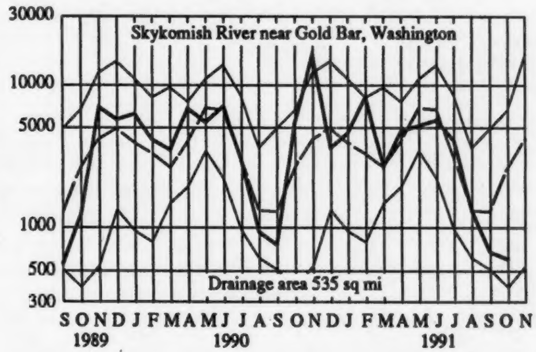


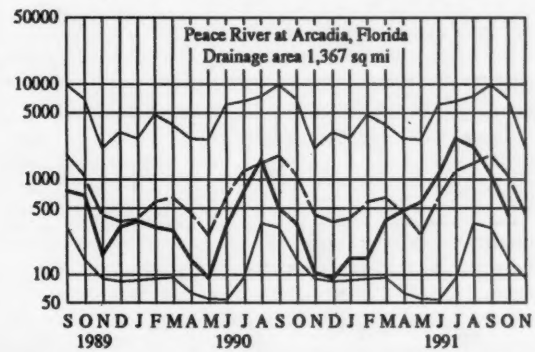


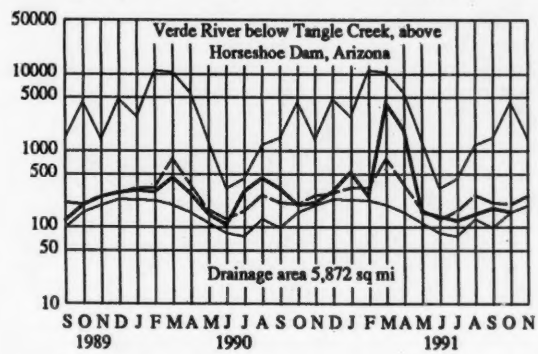
DISCHARGE IN CUBIC FEET PER SECOND

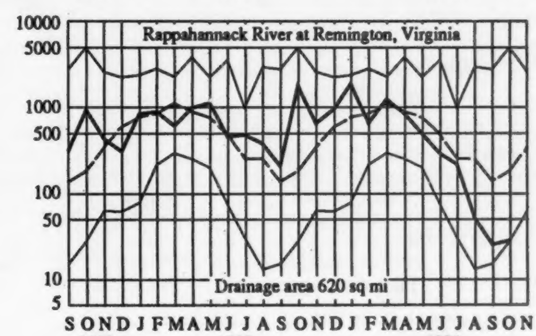






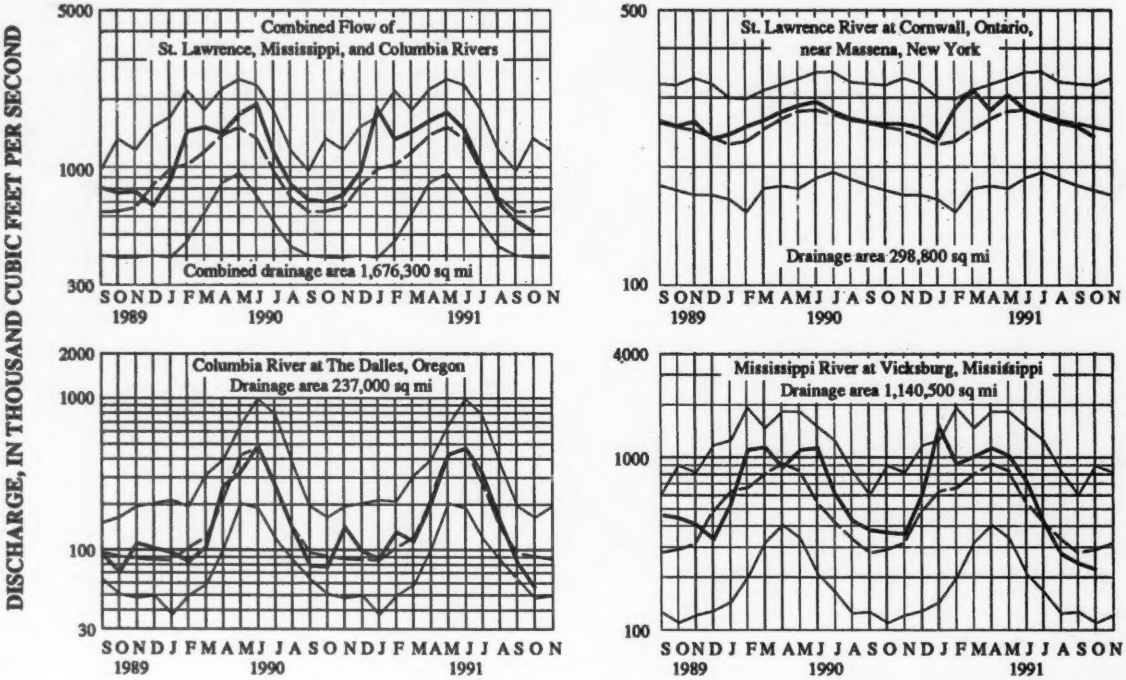






HYDROGRAPHS FOR THE "BIG THREE" RIVERS

Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period.



Provisional data; subject to revision

DISSOLVED SOLIDS AND WATER TEMPERATURES, FOR OCTOBER 1991, AT DOWNSTREAM SITES ON FIVE LARGE RIVERS

Station number	Station name	October data of following calendar years	Stream discharge during month: Mean (cfs)	Dissolved-solids concentration[1]: Minimum (mg/L)	Dissolved-solids concentration[1]: Maximum (mg/L)	Dissolved-solids discharge[1]: Mean (tons per day)	Dissolved-solids discharge[1]: Minimum (tons per day)	Dissolved-solids discharge[1]: Maximum (tons per day)	Water temperature[2]: Mean in °C	Water temperature[2]: Minimum in °C	Water temperature[2]: Maximum in °C
01463500	Delaware River at Trenton,	1991	3,731	108	137	1,245	896	2,485	15.0	11.5	20.5
	New Jersey, (Morrisville,	1944-90	6,848	58	156	[3]1,826	463	13,440	[3]15.0	8.0	25.5
	Pennsylvania)	(Extreme yr)		(1945)	(1953)		(1963)	(1989)			
			[4]4,918								
07289000	Mississippi River at	1991	225,500	277	312	175,400	147,400	195,200	20.0	17.5	23.0
	Vicksburg, Mississippi	1975-90	383,200	183	337	272,700	117,000	639,700	19.5	14.5	26.0
		(Extreme yr)		(1979,	(1983,		(1976)	(1986)			
			[4]295,000	1982)	1987)						
03612500	Ohio River at lock and dam 53,	1991	63,500	[5]166	[5]233	...	[5]28,400	[5]52,200	...	[5]20.0	[5]24.0
	near Grand Chain, Illinois,	1954-90	122,100	135	330	...	11,900	269,000	...	12.0	26.0
	(streamflow station at Metropolis,	(Extreme yr)		(6)	(1967)		(1985)	(1989)			
	Illinois)		[4]96,680								
06934500	Missouri River at Hermann,	1991	41,400	422	480	51,600	48,000	59,100	18.5	14.0	25.0
	Missouri. (60 miles west of	1975-90	79,760	168	558	82,890	51,800	272,000	16.5	10.0	23.0
	St. Louis, Missouri)	(Extreme yr)		(1986)	(1980)		(1976)	(1986)			
			[4]60,140								
14128910	Columbia River at Warrendale,	1991	119,000	93	95	30,200	23,700	38,100	17.0	14.0	19.0
	Oregon (streamflow station at	1975-90	116,300	73	117	31,000	13,200	49,200	16.0	11.0	20.5
	The Dalles, Oregon)	(Extreme yr)		(1981)	(1977)		(1981)	(1987)			
			[4]91,570								

[1]Dissolved-solids concentrations, when not analyzed directly, are calculated on basis of measurements of specific conductance.
[2]To convert °C to °F: [(1.8 x °C) + 32] = °F.
[3]Mean for 7-year period (1983-90).
[4]Median of monthly values for 30-year reference period, water years 1951-80, for comparison with data for current month.
[5]No data available October 4-19
[6]Occurred several years.

Provisional data; subject to revision

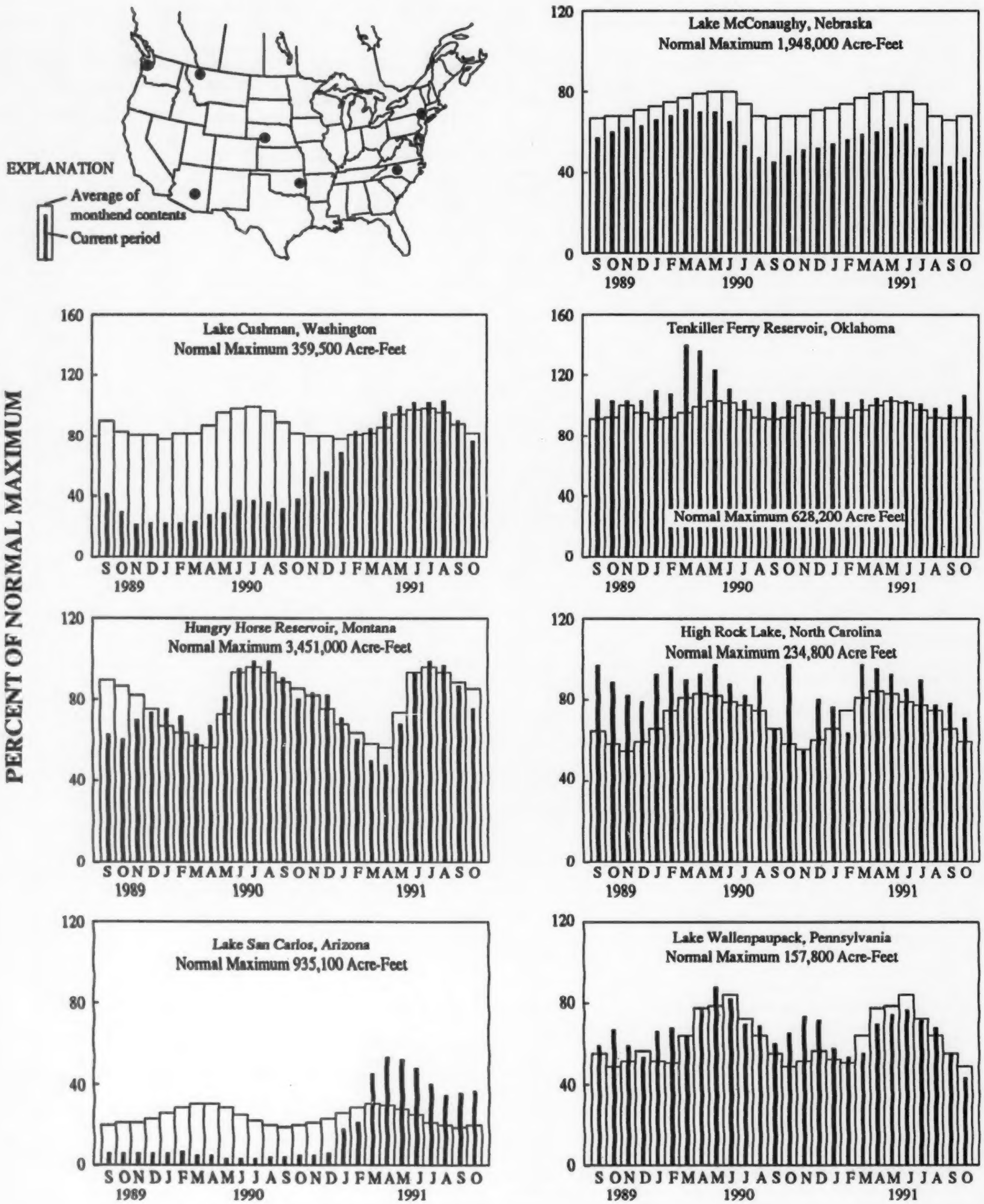
FLOW OF LARGE RIVERS DURING OCTOBER 1991

Station number	Stream and place of determination	Drainage area (square miles)	Average discharge through September 1985 (cubic feet per second)	October 1991: Monthly mean discharge (cubic feet per second)	Percent of median monthly discharge 1951–80	Change in discharge from previous month (percent)	Discharge near end of month: Cubic feet per second	Million gallons per day	Date
01014000	St. John River below Fish River at Fort Kent, Maine ...	5,665	9,758	* 12,760	265	317	13,300	8,600	31
01318500	Hudson River at Hadley, New York	1,664	2,908	1,800	128	145	1,400	900	31
01357500	Mohawk River at Cohoes, New York	3,456	5,683	1,910	74	45	1,200	780	31
01463500	Delaware River at Trenton, New Jersey	6,780	11,670	3,731	76	15	...	...	...
01570500	Susquehanna River at Harrisburg, Pennsylvania	24,100	34,340	5,450	51	42	5,120	3,310	29
01646500	Potomac River near Washington, District of Columbia...	11,560	[1]11,500	† [1]1,760	62	–12	...	...	...
02105500	Cape Fear River at William O. Huske Lock, near Tarheel, North Carolina.	4,852	5,002	1,290	65	–20	...	...	...
02131000	Pee Dee River at Peedee, South Carolina	8,830	9,871	† 3,661	79	–4	5,540	3,580	31
02226000	Altamaha River at Doctortown, Georgia	13,600	13,730	† 3,290	63	–67	2,960	1,910	31
02320500	Suwannee River at Branford, Florida	7,880	6,986	6,004	131	–49	...	...	...
02358000	Apalachicola River at Chattahoochee, Florida	17,200	22,420	13,820	127	–28	...	...	...
02467000	Tombigbee River at Demopolis lock and dam, near Coatopa, Alabama.	15,385	23,520	2,754	70	–46	3,450	2,230	31
02489500	Pearl River near Bogalusa, Louisiana	6,573	9,880	3,546	167	–25	4,300	2,780	31
03049500	Allegheny River at Natrona, Pennsylvania	11,410	[1]19,580	[1]3,042	43	1	2,360	1,520	28
03085000	Monongahela River at Braddock, Pennsylvania	7,337	[1]12,480	† [1]2,006	52	–7	1,550	1,000	28
03193000	Kanawha River at Kanawha Falls, West Virginia	8,367	12,550	† 2,591	43	–33	2,510	1,620	30
03234500	Scioto River at Higby, Ohio	5,131	4,583	687	90	14	786	508	31
03294500	Ohio River at Louisville, Kentucky[2] #	91,170	115,800	22,740	64	–13	24,600	15,900	30
03377500	Wabash River at Mount Carmel, Illinois	28,635	27,660	5,121	74	25	14,500	9,370	31
03469000	French Broad River below Douglas Dam, Tennessee[3] #.	4,543	[1]6,739	† [1]1,921	51	–47	...	...	...
04084500	Fox River at Rapide Croche Dam, near Wrightstown, Wisconsin.[2]	6,010	4,238	2,786	125	32	9,040	5,840	31
04264331	St. Lawrence River at Cornwall, Ontario, near Massena, New York.[4] #	298,800	243,900	239,000	94	–6	237,000	153,000	31
02NG001	St. Maurice River at Grand Mere, Quebec	16,300	24,910	* 25,700	135	180	...	...	...
05082500	Red River of the North at Grand Forks, North Dakota...	30,100	2,593	† 665	49	–51	497	321	31
05133500	Rainy River at Manitou Rapids, Minnesota	19,400	12,920	† 6,220	57	–10	6,340	4,100	28
05330000	Minnesota River near Jordan, Minnesota	16,200	3,680	* 3,354	319	–55	2,350	1,520	31
05331000	Mississippi River at St. Paul, Minnesota#	36,800	[1]11,020	* 10,860	166	–43	9,180	5,930	31
05365500	Chippewa River at Chippewa Falls, Wisconsin	5,650	5,149	3,080	111	–45	4,100	2,650	30
05407000	Wisconsin River at Muscoda, Wisconsin	10,400	8,710	5,620	103	2	8,160	5,270	31
05446500	Rock River near Joslin, Illinois	9,549	6,080	3,360	102	27	4,970	3,210	31
05474500	Mississippi River at Keokuk, Iowa#	119,000	63,790	45,210	128	–16	49,400	31,900	31
06214500	Yellowstone River at Billings, Montana	11,795	7,056	4,020	95	4	4,100	2,650	30
06934500	Missouri River at Hermann, Missouri#	524,200	80,880	† 41,400	69	1	40,300	26,000	31
07289000	Mississippi River at Vicksburg, Mississippi[5] #	1,140,500	584,000	† 225,600	76	–7	211,000	136,000	28
07331000	Washita River near Dickson, Oklahoma	7,202	1,402	* 1,773	342	–67	7,670	4,960	30
08276500	Rio Grande below Taos Junction Bridge, near Taos, New Mexico.	9,730	742	321	116	–39	300	190	31
09315000	Green River at Green River, Utah	44,850	6,391	2,374	83	–17	...	...	...
11425500	Sacramento River at Verona, California	21,251	19,430	† 7,893	74	–17	...	...	...
13269000	Snake River at Weiser, Idaho	69,200	18,520	† 10,900	75	7	11,700	7,560	31
13317000	Salmon River at White Bird, Idaho	13,550	11,390	† 3,480	70	2	3,650	2,360	31
13342500	Clearwater River at Spalding, Idaho	9,570	15,510	† 2,090	55	–2	2,080	1,340	31
14105700	Columbia River at The Dalles, Oregon[6] #	237,000	[1]193,500	† [1]56,860	62	–32	147,000	95,200	31
14191000	Willamette River at Salem, Oregon	7,280	[1]23,690	† [1]3,226	48	71	16,000	10,300	31
15515500	Tanana River at Nenana, Alaska	25,600	23,810	* 17,660	114	–45	11,000	7,100	31
08MF005	Fraser River at Hope, British Columbia	83,800	96,250	† 55,080	75	–37	42,700	27,600	31

#Indicates stations excluded from the combination bar/line graph. See Explanation of Data.
[1]Adjusted.
[2]Records furnished by Corps of Engineers.
[3]Records furnished by Tennessee Valley Authority.
[4]Records furnished by Buffalo District, Corps of Engineers, through International St. Lawrence River Board of Control. Discharges shown are considered to be the same as discharge at Ogdensburg, N.Y., when adjusted for storage in Lake St. Lawrence.
[5]Records of daily discharge computed jointly by Corps of Engineers and Geological Survey.
[6]Discharge determined from information furnished by Bureau of Reclamation, Corps of Engineers, and Geological Survey.

* Above-normal range
† Below-normal range

USABLE CONTENTS OF SELECTED RESERVOIRS AND RESERVOIR SYSTEMS



USABLE CONTENTS OF SELECTED RESERVOIRS AND RESERVOIR SYSTEMS NEAR END OF OCTOBER 1991

[Contents are expressed in percent of reservoir or reservoir system capacity. The usable capacity of reservoir or reservoir system is shown in the column headed "Normal maximum"]

Reservoir or reservoir system Principal uses: F-Flood control I-Irrigation M-Municipal P-Power R-Recreation W-Industrial	Percent of normal maximum: End of October 1991	End of October 1990	Average for end of October	End of September 1991	Normal maximum (acre-feet)[1]
NOVA SCOTIA					
Rossignol, Mulgrave, Falls Lake, St. Margaret's Bay, Black, and Ponhook Reservoirs (P)	*58	36	35	...	[2]226,300
QUEBEC					
Allard (P)	*86	32	59	68	280,600
Gouin (P)	66	76	68	66	6,954,000
MAINE					
Seven Reservoir Systems (MP)	*68	82	53	63	4,107,000
NEW HAMPSHIRE					
First Connecticut Lake (P)	77	84	73	85	76,450
Lake Francis (FPR)	*90	95	76	94	99,310
Lake Winnipesaukee (PR)	*76	85	58	71	165,700
VERMONT					
Harriman (P)	*71	75	62	76	116,200
Somerset (P)	*78	78	69	69	57,390
MASSACHUSETTS					
Cobble Mountain and Borden Brook (MP)	72	87	71	73	77,920
NEW YORK					
Great Sacandaga Lake (FPR)	52	77	55	53	786,700
Indian Lake (FMP)	*67	94	57	75	103,300
New York City Reservoir System (MW)	†48	78	69	52	1,680,000
NEW JERSEY					
Wanaque (M)	†46	65	64	37	85,100
PENNSYLVANIA					
Allegheny (FPR)	†20	48	34	28	1,180,000
Pymatuning (FMR)	†73	99	80	75	188,000
Raystown Lake (FR)	63	69	58	64	761,900
Lake Wallenpaupack (PR)	†43	65	49	56	157,800
MARYLAND					
Baltimore Municipal System (M)	†71	93	83	76	261,900
NORTH CAROLINA					
Bridgewater (Lake James) (P)	*91	98	82	91	288,800
Narrows (Badin Lake) (P)	95	98	93	92	128,900
High Rock Lake (P)	*70	99	59	78	234,800
SOUTH CAROLINA					
Lake Murray (P)	*78	61	64	82	1,614,000
Lakes Marion and Moultrie (P)	*77	84	68	87	1,777,000
SOUTH CAROLINA-GEORGIA					
Strom Thurmond Lake (FP)	*71	64	53	75	1,730,000
GEORGIA					
Burton (PR)	*80	97	70	99	104,000
Sinclair (MPR)	*89	86	78	86	214,000
Lake Sidney Lanier (FMPR)	48	44	50	60	1,686,000
ALABAMA					
Lake Martin (P)	*86	82	69	91	1,375,000
TENNESSEE VALLEY					
Clinch Projects: Norris and Melton Hill Lakes (FPR)	*41	45	33	51	2,293,000
Douglas Lake (FPR)	29	39	24	50	1,395,000
Hiwassee Projects: Chatuge, Nottely, Hiwassee, Apalachia, Blue Ridge, Ocoee 3, and Parksville Lakes (FPR)	*63	60	49	78	1,012,000
Holston Projects: South Holston, Watauga, Boone, Fort Patrick Henry, and Cherokee Lakes (FPR)	*51	51	40	56	2,880,000
Little Tennessee Projects: Nantahala, Thorpe, Fontana, and Chilhowee Lakes (FPR)	*66	22	46	73	1,478,000
WISCONSIN					
Chippewa and Flambeau (PR)	*85	96	78	80	365,000
Wisconsin River (21 Reservoirs) (PR)	60	92	65	74	399,000
MINNESOTA					
Mississippi River Headwater System (FMR)	33	31	29	39	1,640,000
NORTH DAKOTA					
Lake Sakakawea (Garrison) (FIPR)	†67	60	85	66	22,700,000
SOUTH DAKOTA					
Angostura (I)	70	40	68	70	130,770
Belle Fourche (I)	†15	16	35	11	185,200
Lake Francis Case (FIP)	†52	53	60	78	4,589,000
Lake Oahe (FIP)	†58	54	65	61	22,240,000
Lake Sharpe (FIP)	98	101	98	105	1,697,000
Lewis and Clark Lake (FIP)	100	97	104	100	432,000
NEBRASKA					
Lake McConaughy (IP)	†47	48	68	43	1,948,000
OKLAHOMA					
Eufaula (FPR)	*108	96	88	93	2,378,000
Keystone (FPR)	†78	80	87	79	661,000
Tenkiller Ferry (FPR)	*107	103	92	100	628,200
Lake Altus (FIMR)	50	56	48	50	133,000
Lake O'The Cherokees (FPR)	88	90	83	88	1,492,000
OKLAHOMA-TEXAS					
Lake Texoma (FMPRW)	*101	96	93	97	2,722,000
TEXAS					
Bridgeport (IMW)	*97	88	50	90	386,400
Canyon (FMR)	*85	93	79	87	385,600
International Amistad (FIMPW)	*104	94	86	104	3,497,000
International Falcon (FIMPW)	*98	68	74	73	2,668,000
Livingston (IMW)	*99	101	86	100	1,788,000
Possum Kingdom (IMPRW)	93	92	97	94	570,200
Red Bluff (P)	25	20	28	20	307,000
Toledo Bend (P)	74	80	78	86	4,472,000
Twin Buttes (FIM)	37	45	33	34	177,800
Lake Kemp (IMW)	*100	90	85	101	268,000
Lake Meredith (FMW)	38	33	37	38	796,900
Lake Travis (FIMPRW)	*86	90	80	85	1,144,000
MONTANA					
Canyon Ferry (FIMPR)	†75	79	86	75	2,043,000
Fort Peck (FPR)	†63	58	84	65	18,910,000
Hungry Horse (FIPR)	†75	80	85	86	3,451,000
WASHINGTON					
Ross (PR)	84	92	85	93	1,052,000
Franklin D. Roosevelt Lake (IP)	98	100	101	95	5,022,000
Lake Chelan (PR)	74	83	74	91	676,100
Lake Cushman (PR)	†76	38	82	90	359,500
Lake Merwin (P)	*103	61	86	103	245,600
IDAHO					
Boise River (4 Reservoirs) (FIP)	†16	31	46	14	1,235,000
Coeur d'Alene Lake (P)	58	65	54	77	238,500
Pend Oreille Lake (FP)	†49	53	66	86	1,561,000
IDAHO-WYOMING					
Upper Snake River (8 Reservoirs) (MP)	†39	27	48	39	4,401,000
WYOMING					
Boysen (FIP)	84	74	82	88	802,000
Buffalo Bill (IP)	†59	37	72	65	421,300
Keyhole (F)	†15	16	40	15	193,800
Pathfinder, Seminoe, Alcova, Kortes, Glendo, and Guernsey Reservoirs (I)	†33	31	46	32	3,056,000
COLORADO					
John Martin (FIR)	†2	4	16	2	364,400
Taylor Park (IR)	*76	76	56	80	106,200
Colorado-Big Thompson Project (I)	55	48	55	56	730,300
COLORADO RIVER STORAGE PROJECT					
Lake Powell; Flaming Gorge, Fontenelle, Navajo, and Blue Mesa Reservoirs (IFPR)	†64	68	76	65	31,620,000
UTAH-IDAHO					
Bear Lake (IPR)	†30	33	59	31	1,421,000
CALIFORNIA					
Folsom (FIMPR)	†42	17	51	51	1,000,000
Hetch Hetchy (MP)	*58	31	49	68	360,400
Isabella (FIR)	†16	8	25	17	568,100
Pine Flat (FIR)	†5	3	36	3	1,001,000
Clair Engle Lake (Lewiston) (FP)	†23	42	67	29	2,438,000
Lake Almanor (P)	*65	68	53	68	1,036,000
Lake Berryessa (FIMRW)	†34	38	72	36	1,600,000
Millerton Lake (FI)	33	32	33	35	503,200
Shasta Lake (FIPR)	†31	38	62	30	4,377,000
CALIFORNIA-NEVADA					
Lake Tahoe (IMPRW)	†0	0	47	0	744,600
NEVADA					
Rye Patch (I)	†1	0	48	1	194,300
ARIZONA-NEVADA					
Lake Mead and Lake Mohave (FIMP)	74	76	72	74	27,970,000
ARIZONA					
San Carlos (IP)	*37	5	20	36	935,100
Salt and Verde River System (IMPR)	*74	39	39	77	2,019,100
NEW MEXICO					
Conchas (FIR)	85	58	82	87	315,700
Elephant Butte and Caballo (FIPR)	*66	39	39	71	2,394,000

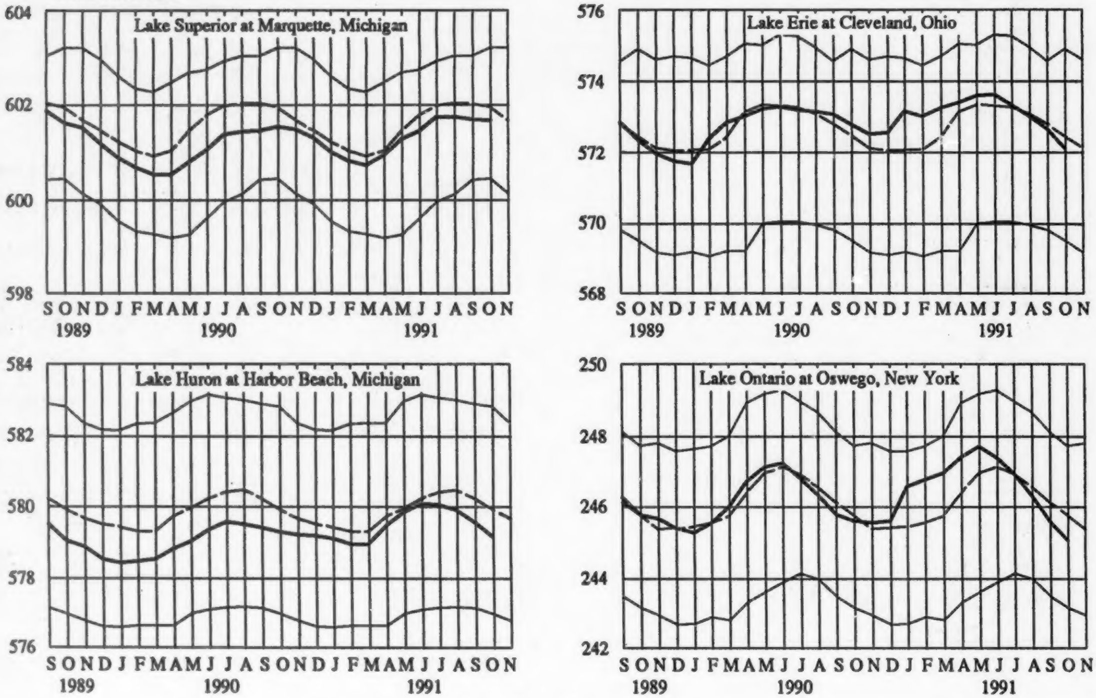
[1]1 acre-foot = 0.04356 million cubic feet = 0.326 million gallons = 0.504 cubic feet per second per day.
[2]Thousands of kilowatt-hours (the potential electric power that could be generated by the volume of water in storage).

* Above-average range
† Below-average range

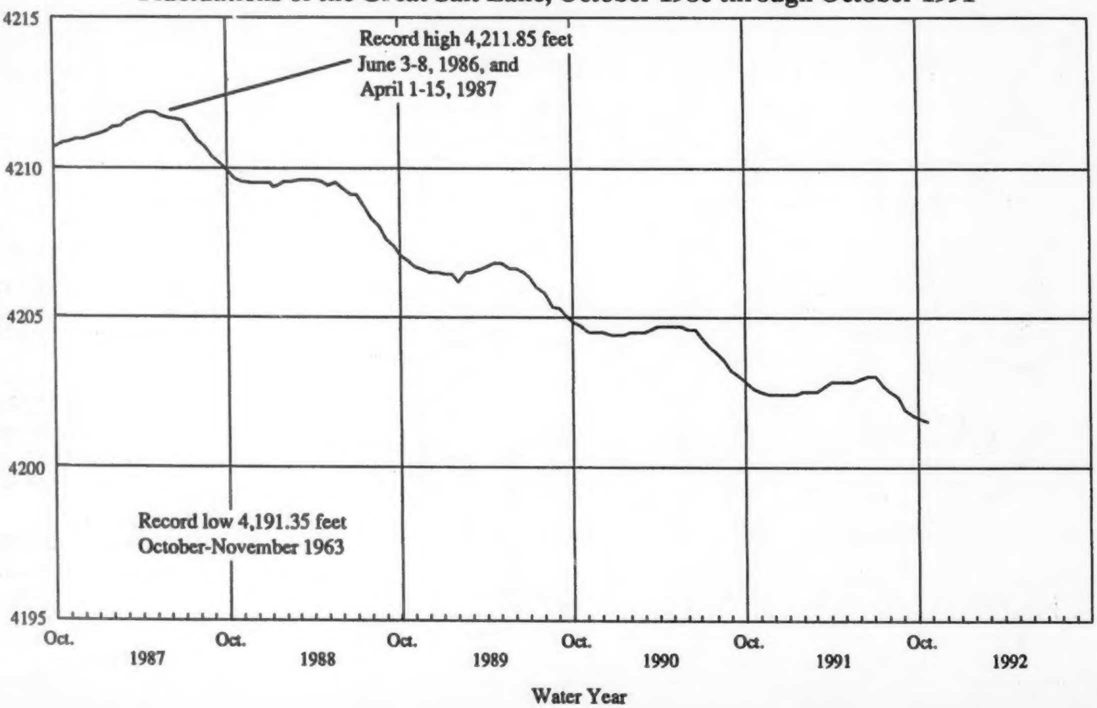
GREAT LAKES ELEVATIONS

Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period. Data from National Ocean Service.

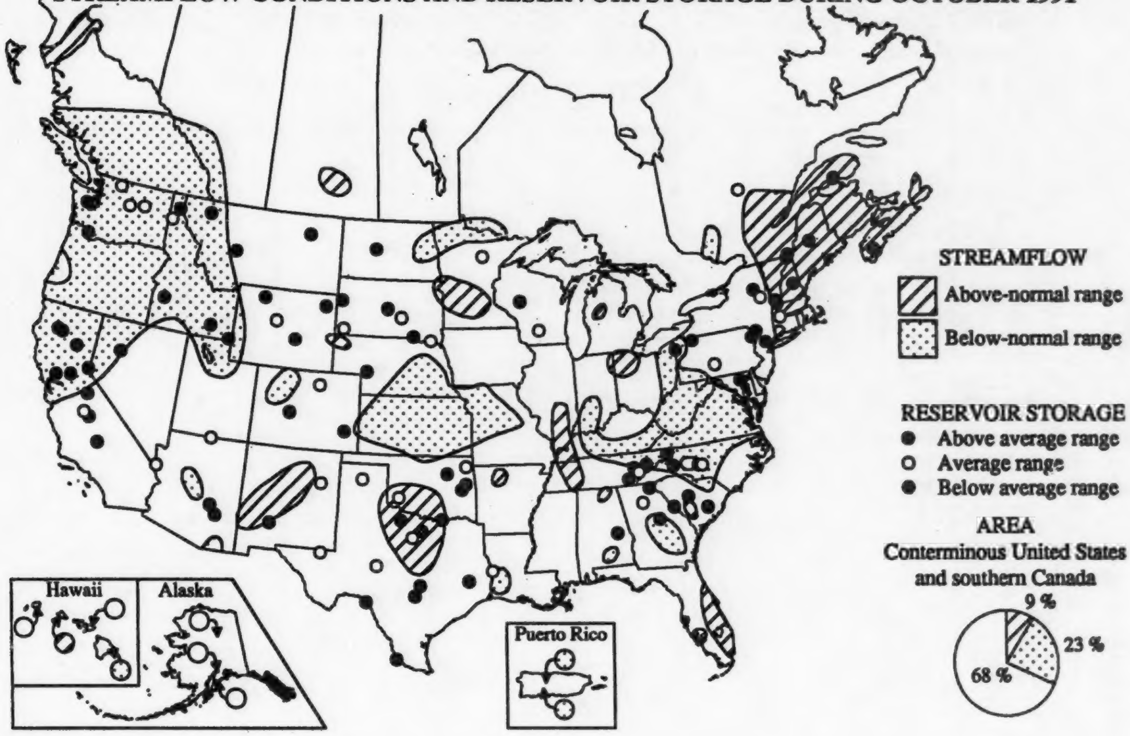
ELEVATION, IN FEET ABOVE NATIONAL GEODETIC VERTICAL DATUM OF 1929



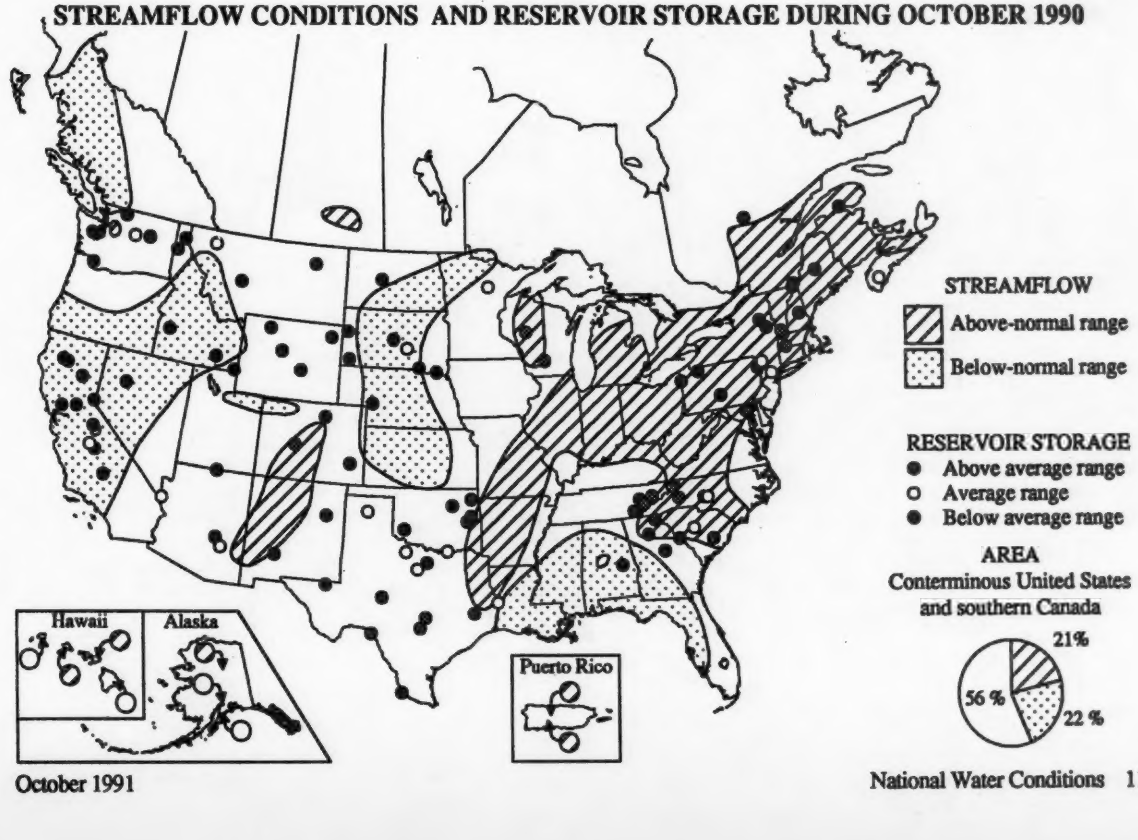
Fluctuations of the Great Salt Lake, October 1986 through October 1991



STREAMFLOW CONDITIONS AND RESERVOIR STORAGE DURING OCTOBER 1991



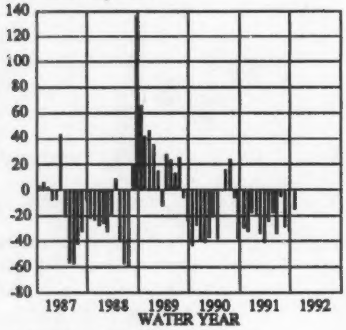
STREAMFLOW CONDITIONS AND RESERVOIR STORAGE DURING OCTOBER 1990



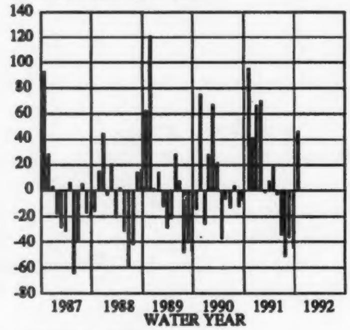
MONTHLY DEPARTURE OF ACTUAL STREAMFLOW (OCTOBER 1987-SEPTEMBER 1992) FROM MEDIAN STREAMFLOW (1951-80)

PERCENT DEPARTURE FROM 1951-80 MEDIAN STREAMFLOW

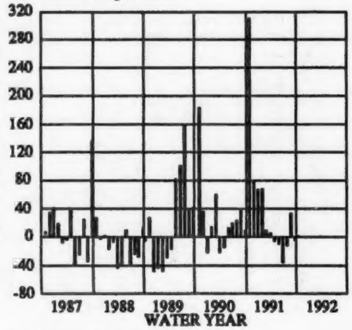
1. Hudson Bay basin



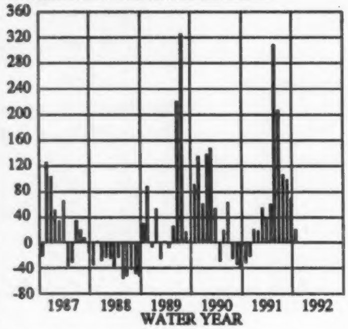
2. St. Lawrence River basin



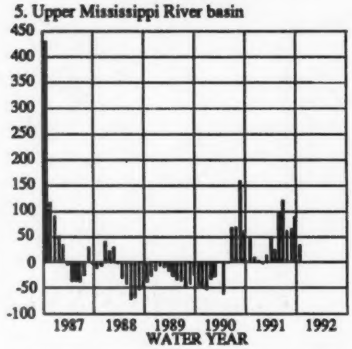
3. Atlantic Slope basins



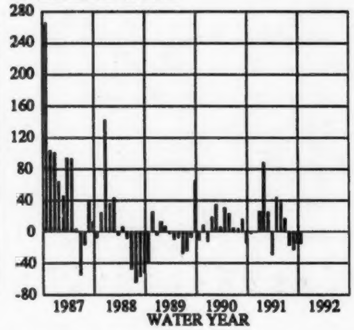
4. Florida and Gulf of Mexico basins



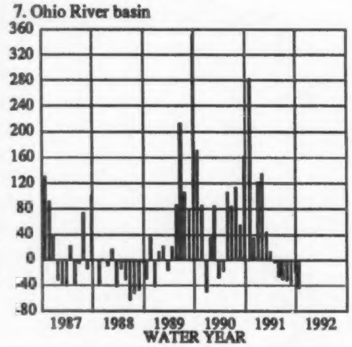
5. Upper Mississippi River basin



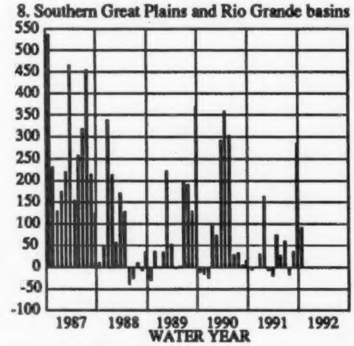
6. Missouri River basin



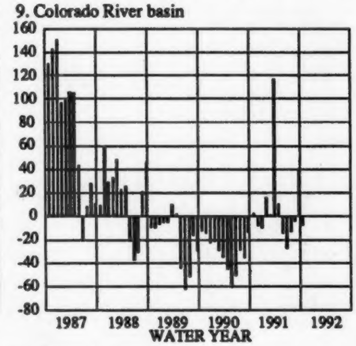
7. Ohio River basin



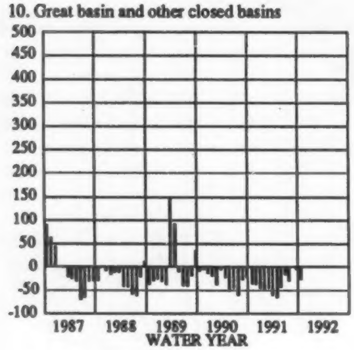
8. Southern Great Plains and Rio Grande basins



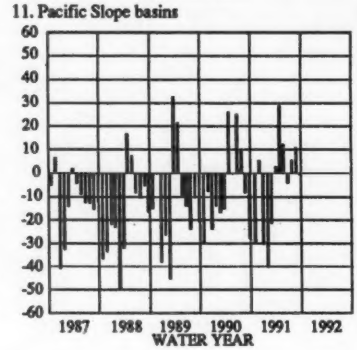
9. Colorado River basin



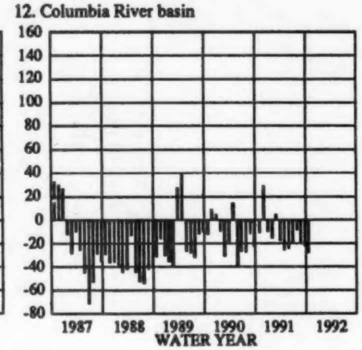
10. Great basin and other closed basins



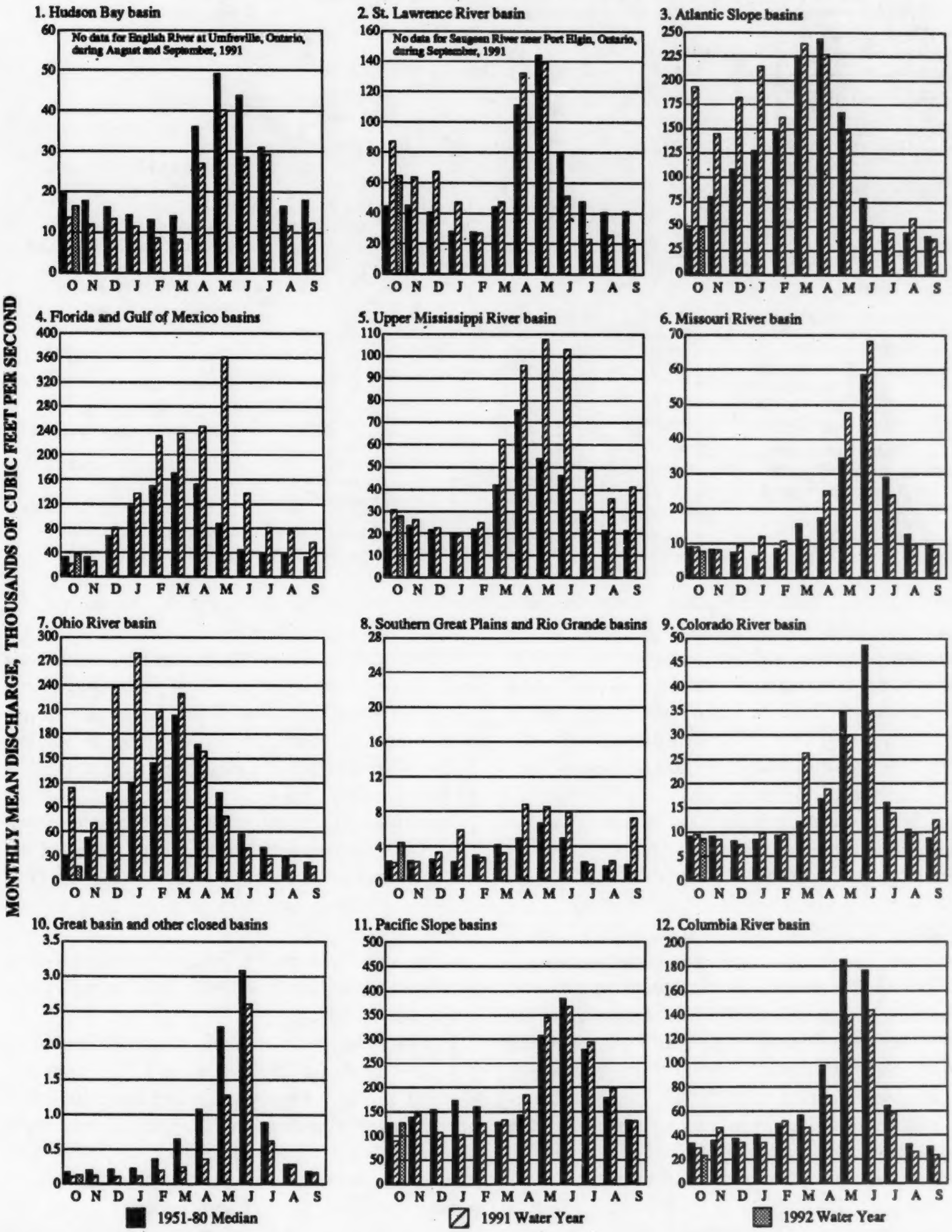
11. Pacific Slope basins



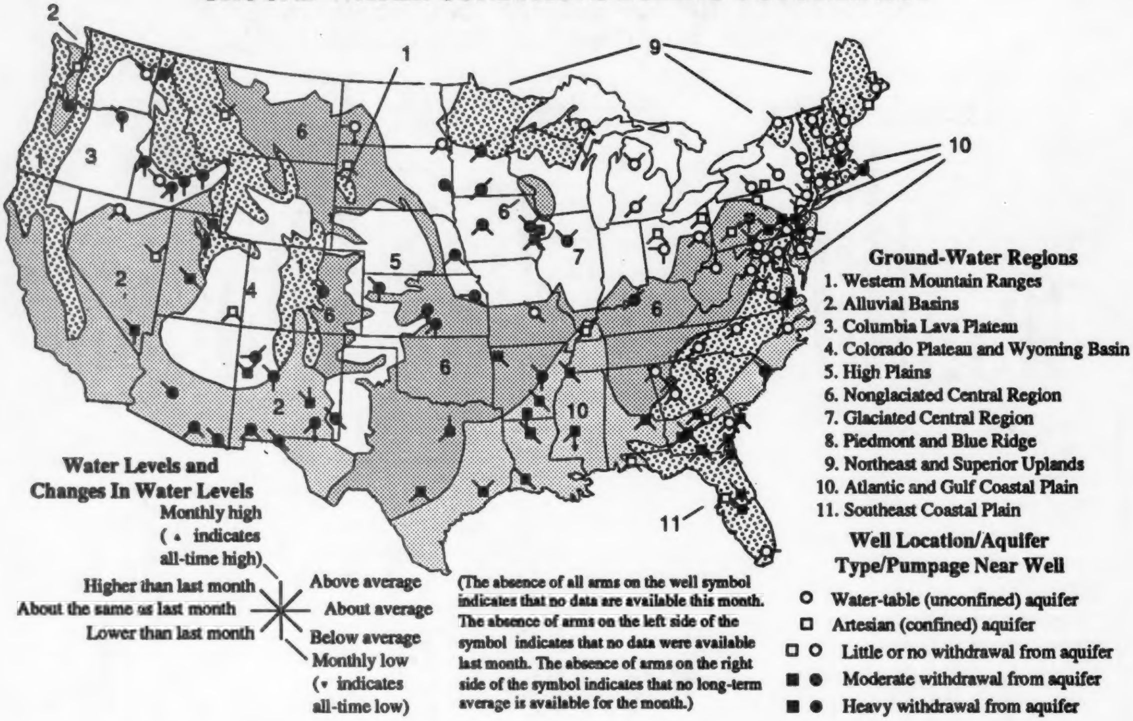
12. Columbia River basin



ACTUAL MONTHLY STREAMFLOW, 1991 AND 1992 WATER YEARS, COMPARED WITH MEDIAN MONTHLY STREAMFLOW, 1951-80



GROUND-WATER CONDITIONS DURING OCTOBER 1991



New extremes occurred at 28 ground-water index stations (see table on page 16) during October-23 lows (including 6 all-time) and 5 highs—compared with 31 new extremes last month. Graphs showing water levels at seven stations for the past 26 months are on page 17. The graphs on page 19 are for wells in the Alluvial Basins region in Nevada and New Mexico, the Glaciated Central region in North Dakota and Iowa, the Nonglaciated Central region in Georgia, and the Atlantic and Gulf Coastal Plain region in Alabama and Delaware.

Ground-water levels in the Western Mountain Ranges region were above last month's levels in Washington and Montana and below last month's levels in Idaho. Levels were above long-term averages throughout the region.

In the Alluvial Basins region, ground-water levels were below last month's level in Washington, above last month's levels in Oregon, Utah, and Texas, and mixed with respect to last month's levels in Nevada, Arizona, and New Mexico. Levels were above long-term averages in Washington and Oregon, below long-term averages in Utah, Arizona, and Texas, and mixed with respect to average in Nevada and New Mexico. Level fell to an all-time low in the Roswell Basin shallow aquifer well at Dayton, New Mexico. October lows occurred in wells in Nevada, Utah, and New Mexico. An August high occurred in one well in New Mexico.

In the Columbia Lava Plateau region, ground-water levels were above last month's levels in Oregon and mixed with respect to last month's levels in Idaho. Levels were below long-term averages throughout the Region. At five of the six reported wells, levels were at or below the previous October lows.

Ground-water levels in the Colorado Plateau and Wyoming Basin region were below last month's level in Utah and at or above last month's levels in New Mexico. Levels were below long-term average in Utah and above average in New Mexico.

In the High Plains region, ground-water levels were above last month's levels and below long-term averages throughout the region.

Ground-water levels in the Nonglaciated Central region were above last month's levels in Colorado and Missouri, mixed in Pennsylvania, and at or below last month's levels elsewhere in the region. Levels were above long-term averages in Kentucky and West Virginia, mixed in Texas and Pennsylvania, and below average elsewhere. October lows occurred in wells in North Dakota, Kansas, and Pennsylvania. Monthly highs

Provisional data; subject to revision

WATER LEVELS IN KEY OBSERVATION WELLS IN SOME REPRESENTATIVE AQUIFERS IN THE CONTERMINOUS UNITED STATES–OCTOBER 1991

GROUND–WATER REGION Aquifer and Location	Aquifer type and local aquifer pumpage	Depth of well in feet	Water level in feet below land–surface datum	Departure from average in feet	Net change in water level in feet since: Last month	Last year	Year records began	Remarks
WESTERN MOUNTAIN RANGES (1)								
Rathdrum Prairie aquifer near Athol, northern Idaho	●	485	457.9	2.0	–0.5	2.8	1929	
ALLUVIAL BASINS (2)								
Alluvial valley fill aquifer in Steptoe Valley, Nevada	□	122	9.06	3.53	.22	–.37	1949	
Valley fill aquifer, Elfrida area near Douglas, Arizona	●	124	102.96	–19.57	.34	–1.72	1947	
Hueco bolson aquifer at El Paso, Texas	●	640	272.56	–20.70	.13	.12	1964	
COLUMBIA LAVA PLATEAU (3)								
Snake River Plain aquifer near Eden, Idaho	●	208	123.6	–8.1	–.6	–5.2	1962	Oct. low
Columbia River basalt aquifer, Pendleton, Oregon		1,501	222.69	31.67	1.24	–2.58	1965	Oct. low
COLORADO PLATEAU AND WYOMING BASIN (4)								
Dakota aquifer near Blanding, Utah	□	140	49.27	–3.59	–.11	–2.96	1960	
HIGH PLAINS (5)								
Ogallala aquifer near Colby, Kansas	●	175	131.21	–11.85	.12	–1.20	1947	Oct. low
Southern High Plains aquifer, Lovington, New Mexico	●	212	59.64	–4.04	.30	.34	1971	
NONGLACIATED CENTRAL REGION (6)								
Sentinel Butte aquifer near Dickinson, North Dakota	○	160	21.69	–3.33	–.06	–.70	1968	All–time low
Sand and gravel Pleistocene aquifer near Valley Center, Kansas	●	54	21.26	–4.05	–.44	–1.33	1937	Oct. low
Glacial outwash sand and gravel aquifer near Louisville, Kentucky	●	94	17.33	7.23	–.31	.55	1945	
Upper Pennsylvanian aquifer in the Central Appalachians Plateau near Glenville, West Virginia	○	25	13.08	4.27	.09	2.41	1953	Oct. high
GLACIATED CENTRAL REGION (7)								
Fluvial sand and gravel aquifer, Platte River Valley, near Ashland, Nebraska	●	12	8.75	–2.32	–.50	–1.05	1933	
Sheyenne Delta aquifer near Wyndmere, North Dakota	○	40	8.27	–2.19	–.34	.38	1963	
Pleistocene (glacial drift) aquifer at Princeton in northern Illinois	●	29	6.85	6.27	2.08	–.27	1942	
Shallow drift aquifer near Roscommon in north–central part of Lower Peninsula, Michigan	○	14	3.86	1.10	.99	1.00	1934	
Silurian–Devonian carbonate aquifer near Dola, Ohio	□	51	12.25	–2.58	–.94	–6.13	1954	
PIEDMONT AND BLUE RIDGE (8)								
Water–table aquifer in Petersburg Granite, southeastern Piedmont, Colonial Heights, Virginia	○	100	17.13	–.80	.13	–1.26	1939	
Weathered granite aquifer, western Piedmont, Mocksville area, North Carolina	○	31	16.81	2.22	–.45	–1.16	1981	
Surficial aquifer at Griffin, Georgia	○	30	18.32	–.53	–1.50	2.52	1943	
NORTHEAST AND SUPERIOR UPLANDS (9)								
Pleistocene glacial outwash aquifer, at Camp Ripley, near Little Falls, Minnesota	●	59	14.07	1.10	–.23	.51	1949	
Glacial outwash sand aquifer at Oxford, Maine	○	39	8.47	1.03	.31	.88	1980	Oct. high
Shallow sand aquifer (glacial deposits), Acton, Massachusetts	●	34	19.64	.33	.41	.10	1965	
Pleistocene sand aquifer near Morrisville, Vermont	○	50	19.41	.36	.85	3.26	1966	
ATLANTIC AND GULF COASTAL PLAIN (10)								
Columbia deposits aquifer near Camden, Delaware	○	11	8.53	–1.13	–.45	–1.05	1950	
Memphis sand aquifer near Memphis, Tennessee	■	384	107.35	–15.97	.36	.98	1940	
Eutaw aquifer in the City of Montgomery, Alabama	■	270	25.3	–1.6	–.5	2.2	1952	
Evangeline aquifer at Houston, Texas	■	1,152	298.96	7.41	.43	11.59	1978	
SOUTHEAST COASTAL PLAIN (11)								
Upper Floridan aquifer on Cockspur Island, Savannah area, Georgia	■	348	35.16	–6.63	–1.26	3.67	1956	
Upper Floridan aquifer, Jacksonville, Florida	■	905	–23.4	–4.2	–.4	3.4	1930	
Biscayne aquifer near Homestead, Florida	○	20	–6.33	.06	–.84	.39	1932	

occurred in wells in Texas and West Virginia. An all-time low occurred in a well in the Sentinel Butte aquifer near Dickinson, North Dakota.

Ground-water levels in the Glaciated Central region were at or below last month's levels in North Dakota, Minnesota, Nebraska, Kansas, and Ohio; generally above last month's levels in Illinois, and New York; and mixed elsewhere. Levels were above long-term average in Minnesota, Illinois, and Michigan, mixed with respect to average in Iowa, and below average elsewhere. Level fell to an October low in a well in Ohio. An all-time low occurred in the well in the Cambrian-Ordovician aquifer at Mt. Vernon, Iowa.

Ground-water levels in the Piedmont and Blue Ridge

NEW EXTREMES DURING OCTOBER AT GROUND–WATER INDEX STATIONS

WRD Station Identification Number	GROUND–WATER REGION Aquifer and Location	Aquifer type and local aquifer pumpage	Depth of well	Years of record	End-of-month water level in feet below land surface datum: Previous October Record: Average	Extreme (year)	October 1991
	LOW WATER LEVELS						
	ALLUVIAL BASINS						
324340104231701	Roswell Basin shallow aquifer at Dayton, New Mexico	●	250	39	93.04	122.73 (1990)	[1]123.32
351051106395304	Basin-fill aquifer at Albuquerque, New Mexico	●	980	8	33.77	36.99 (1989)	37.61
361611115151301	Valley fill aquifer near Las Vegas, Nevada	■	905	45	33.80	97.30 (1990)	100.65
403803111505301	Basin fill aquifer near Holladay, Utah	■	165	12	68.09	84.29 (1990)	86.99
	COLUMBIA LAVA PLATEAU						
423659114111601	Snake River Plain aquifer near Eden, Idaho	●	208	29	115.5	122.5 (1982)	123.6
432700112470801	Snake River Plain aquifer near Atomic City, Idaho	●	636	41	584.5	587.5 (1981)	587.6
433852116244801	Shallow alluvium aquifer near Meridian, Idaho	●	31	56	7.0	9.8 (1988)	10.3
453934118491701	Columbia River basalts aquifer at Pendleton, Oregon	●	1,501	26	189.92	219.80 (1990)	222.69
	HIGH PLAINS						
392329101040201	Ogallala aquifer near Colby, Kansas	●	175	44	119.36	130.01 (1990)	131.21
	NONGLACIATED CENTRAL REGION						
375039097234201	Sand and gravel Pleistocene aquifer near Valley Center, Kansas	●	54	54	17.21	20.11 (1956)	21.26
375810097324301	Equus aquifer near Halstead, Kansas	●	57	51	22.74	36.97 (1990)	40.04
404140077354001	Carbonate aquifer at Roseann, Pennsylvania	■	200	8	65.69	75.22 (1986)	76.23
465755102410701	Sentinel Butte aquifer near Dickinson, North Dakota	○	160	22	18.36	20.99 (1990)	[1]21.69
	GLACIATED CENTRAL REGION						
395118082573300	Glacial drift aquifer near Reese, Ohio	○	53	45	12.43	13.22 (1988)	13.43
415534091251502	Cambrian-Ordovician aquifer at Mt. Vernon, Iowa	■	1,557	4	334.98	338.12 (1989)	[1]341.80
	PIEDMONT AND BLUE RIDGE						
385638077220101	Water-table aquifer at Reston, Virginia	○	205	15	15.56	17.01 (1980)	17.56
	ATLANTIC AND GULF COASTAL PLAIN						
321945090152201	Sparta aquifer system at Jackson, Mississippi	■	852	47	263.22	309.90 (1990)	[1]312.54
331438092411901	Sparta aquifer near El Dorado, Arkansas	■	540	37	331.36	355.02 (1990)	[1]372.92
335115079033500	Pee Dee aquifer at Collins Park at Conway, South Carolina	■	438	17	36.85	62.34 (1990)	62.75
344607091543401	Mississippi Valley alluvial aquifer near Lonoke, Arkansas	●	135	15	108.18	118.67 (1990)	119.82
364059076544901	Middle Potomac aquifer at Franklin, Virginia	■	305	30	168.21	206.99 (1990)	211.01
372506076511703	Upper Potomac aquifer near Toano, Virginia	■	401	6	158.90	162.06 (1990)	[1]163.57
395524074502501	Upper aquifer, Potomac-Raritan-Magothy aquifer system near Medford, New Jersey	■	410	26	113.87	140.20 (1988)	140.53
	HIGH WATER LEVELS						
	ALLUVIAL BASINS						
332615104303601	Roswell Basin artesian aquifer at Roswell, New Mexico	■	324	25	58.41	44.27 (1990)	39.10
	NONGLACIATED CENTRAL REGION						
324842097102901	Twin Mountains (Trinity) aquifer near Hurst/Fort Worth, Texas	■	667	13	461.19	451.71 (1983)	447.09
385604080495901	Upper Pennsylvanian aquifer near Glenville, West Virginia	○	25	38	17.35	14.70 (1990)	13.08
	NORTHEAST AND SUPERIOR UPLANDS						
440823070291501	Glacial outwash sand aquifer at Oxford, Maine	○	39	11	9.50	8.93 (1984)	8.47
445227067520101	Glacial sand and gravel aquifer at Hadley Lakes, Maine	○	30	6	5.69	5.44 (1987)	4.46

[1] All-time month-end low.

region were above last month's levels in New Jersey, mixed in Virginia, and at or below last month's levels elsewhere. Levels were below long-term averages in Maryland and Georgia; above long-term averages in New Jersey and North Carolina; and mixed elsewhere in the region. An October low occurred in a well in Virginia.

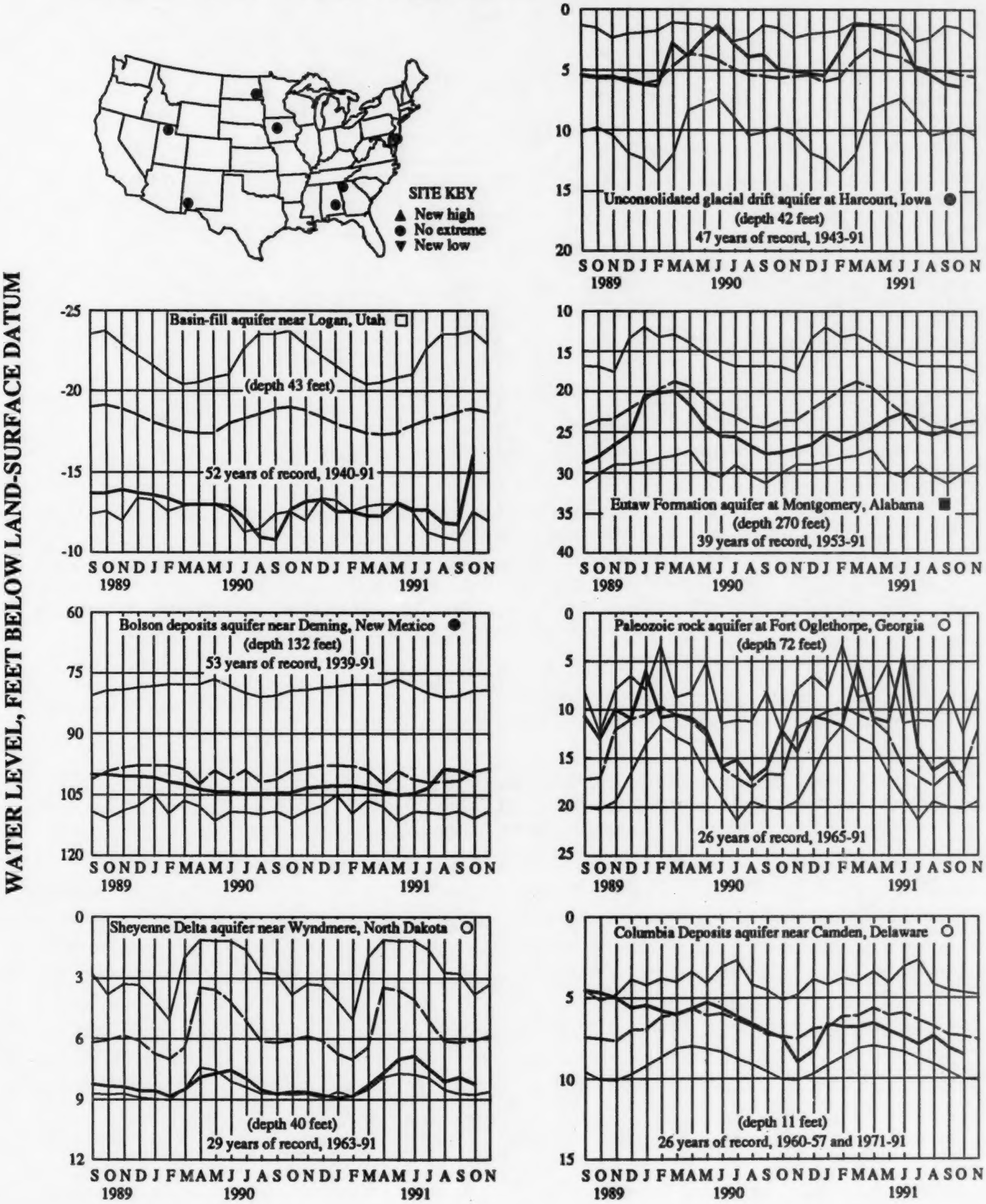
In the Northeast and Superior Uplands region, levels were below last month's in Minnesota and Michigan and at or above last month's and above long-term average elsewhere, except in Michigan where levels were below average. October highs occurred in two wells in Maine.

In the Atlantic and Gulf Coastal Plain region, water levels were above last month's in South Carolina, Tennessee, Arkansas, Louisiana, and Texas; mixed in New Jersey; and at or below last month's levels elsewhere. Ground-water levels were above long-term averages in North Carolina, Kentucky, and Texas; and at or below average elsewhere. October lows occurred in wells in New Jersey, Virginia, South Carolina, Mississippi, and Arkansas. All-time lows occurred in wells in the Upper Potomac aquifer near Toano, Virginia, in the Sparta aquifer system at Jackson, Mississippi, and in the Sparta aquifer near El Dorado, Arkansas.

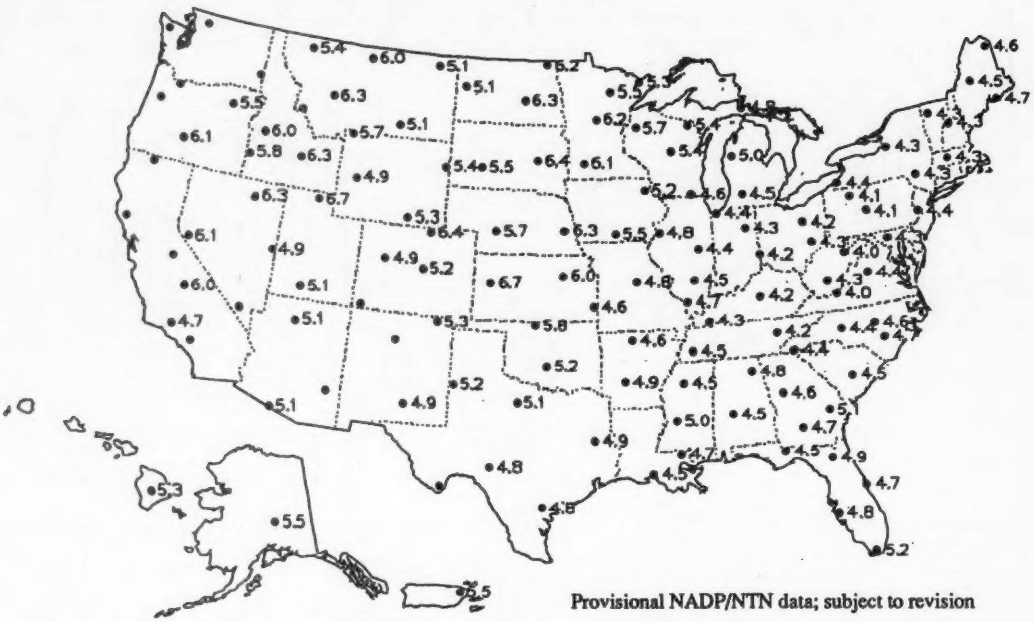
In the Southeast Coastal Plain region, water levels were generally below last month's levels in Georgia and mixed with respect to last month's levels in Florida. Levels were mixed with respect to long-term average in Georgia and generally at or below average in Florida.

MONTHEND GROUND-WATER LEVELS IN SELECTED WELLS

Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates average of monthly levels in previous years. Heavy line indicates level for current period.



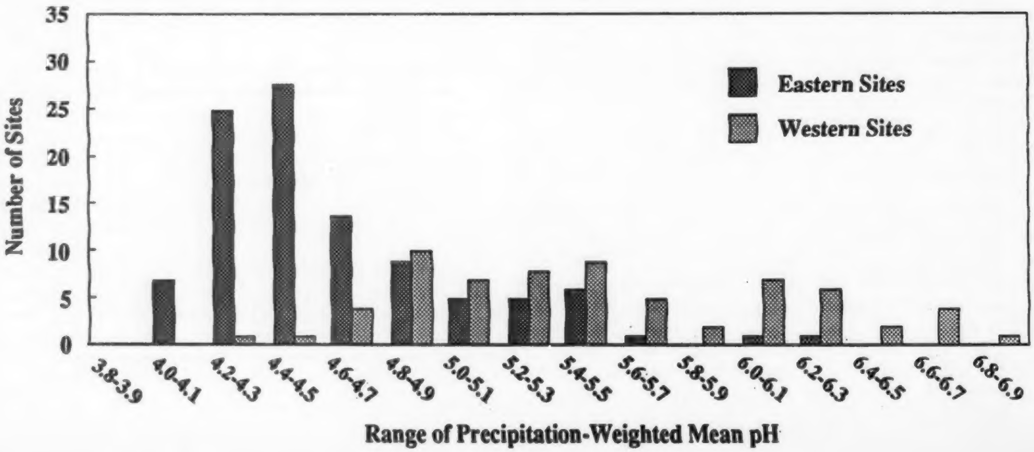
pH of Precipitation for September 23-October 20, 1991

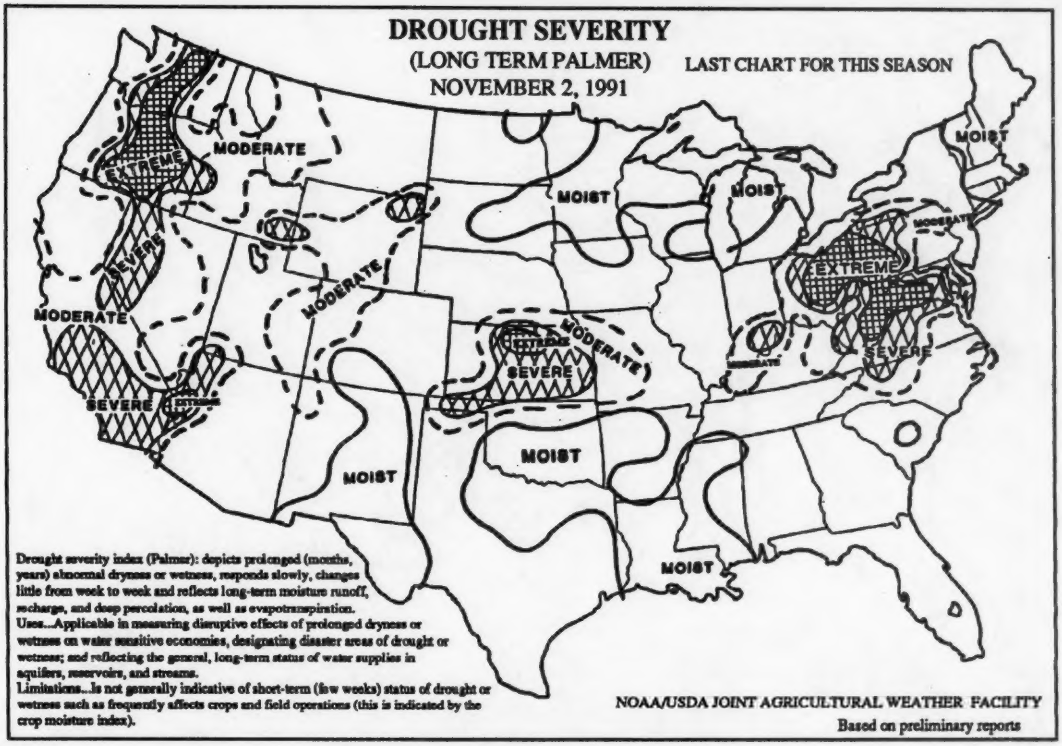


Current pH data shown on the map (• 4.9) are precipitation-weighted means calculated from preliminary laboratory results provided by the NADP/NTN Central Analytical Laboratory at the Illinois State Water Survey and are subject to change. The 128 points (•) shown on this map represent a subset of all sites chosen to provide relatively even geographic spacing. Absence of a pH value at a site indicates either that there was no precipitation or that data for the site did not meet preliminary screening criteria for this provisional report.

A list of the approximately 200 sites comprising the total Network and additional data for the sites are available from the NADP/NTN Coordination Office, Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, CO 80523.

Distribution of precipitation-weighted mean pH for all NADP/NTN sites having one or more weekly samples for September 23-October 20, 1991. The East/West dividing line is at the western borders of Minnesota, Iowa, Missouri, Arkansas, and Louisiana.





OCTOBER WEATHER SUMMARY

Most of October's weather highlights were generated by winter-like storms that blasted through the Western and Central States after the 22nd. Until that time, a relatively stable atmospheric pattern kept the West very warm and dry and the East cool, with substantial precipitation falling only in the Nation's northeastern quadrant and in Florida.

Significant storminess occurred only twice before the 23rd. Both times, storm centers dove southeastward out of Canada and tapped subtropical moisture, spreading rain from the Midwest to New England and along the Atlantic coastline. The first low-pressure center deposited more than 4 inches of rain in a band from Missouri to Michigan between the 2nd and the 5th. Excessive rainfall, locally topping 10 inches, inundated northeastern Florida on the 1st, followed by additional downpours on the 5th. Florida rains shifted to the Miami area thereafter, where heavy rain fell from the 7th to the 9th and on a half-dozen days between the 14th and the 25th, causing considerable flooding. The second Canadian storm delivered its heaviest rain from the Middle Atlantic States to New England.

With the lack of storminess in the East, a large swath from the Panhandle of Florida to western Pennsylvania had less than 50 percent of the normal rainfall for the month. The central and southern Appalachians were especially dry, contributing to the ignition of numerous forest fires by late October. In the Western and Central States, precipitation during the last week of the month quashed the threat of wildfires and eased long-term dryness.

October's first week was warm in the East and West but chilly in the Plains. After a cold front swept off the east coast on the 6th, cool air settled across the Nation's eastern half (50 daily record lows) until after mid-month. Meanwhile, the West baked in unusual autumn heat (more than 140 daily record highs set) until the final 10 days of the month. In the center third of the Nation, warm, dry spells were interspersed with seasonably cool ones until frigid air arrived late in the month.

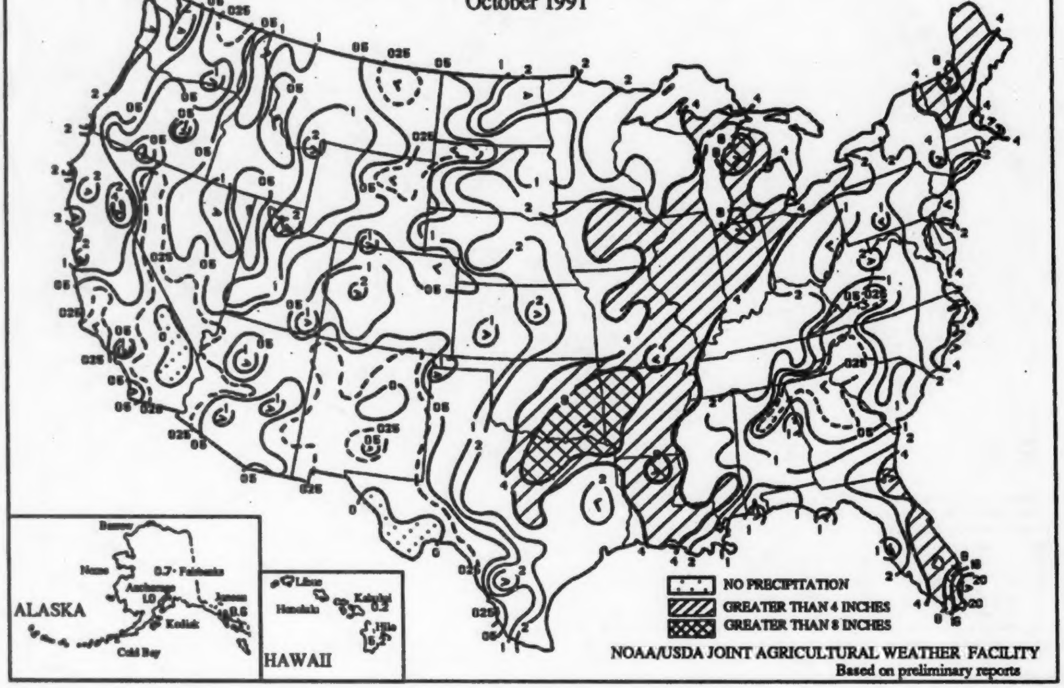
After the 20th, signs of a major weather change appeared. The East warmed (40 daily record highs), and the first of three powerful Alaskan storms plunged into the Northwest. Between contrasting airmasses, excessive rain pounded areas from Texas and Louisiana to the Great Lakes States, while precipitation fell in the central Plains for the first time in more than a month. Prior to the passage of the first storm, winds increased, fanning numerous Western wildfires, including one that swept through wooded residential sections of Oakland, CA. By the 23rd, snow blanketed the northern Plains (up to 10 inches in North Dakota) and the northern and central Rockies. The second storm drove cold air into the Southwest and provided California with its first statewide precipitation of the autumn on the 25th and 26th. Snow accumulated from the Great Basin to the northern Plains.

A ferocious winter storm (both in terms of snow and cold) was in progress as October ended. Spokane, WA, set three daily record lows in a row, including a 10 °F chiller on the 30th. Several cities in the northern Plains set alltime October record lows, including Dickinson, ND (-7 °F; former October record was 3 °F in 1951). On the 31st, the maximum temperature struggled to 25 °F in Amarillo, TX. Heavy snow fell throughout the Rockies and from northern Texas to Minnesota, establishing several record October snowfall records. Bismarck, ND, netted 20.1 inches of snow for the month, nearly doubling the 1919 record (11.4 inches). Both Grand Island, NE, and Sioux City, IA, garnered 10 inches of snow on the 30th and 31st. Eastern Nebraska and western Iowa received major ice accumulations. Farther north, the storm lingered into early November (Minneapolis, MN: 8 inches in October and 20 inches in November).

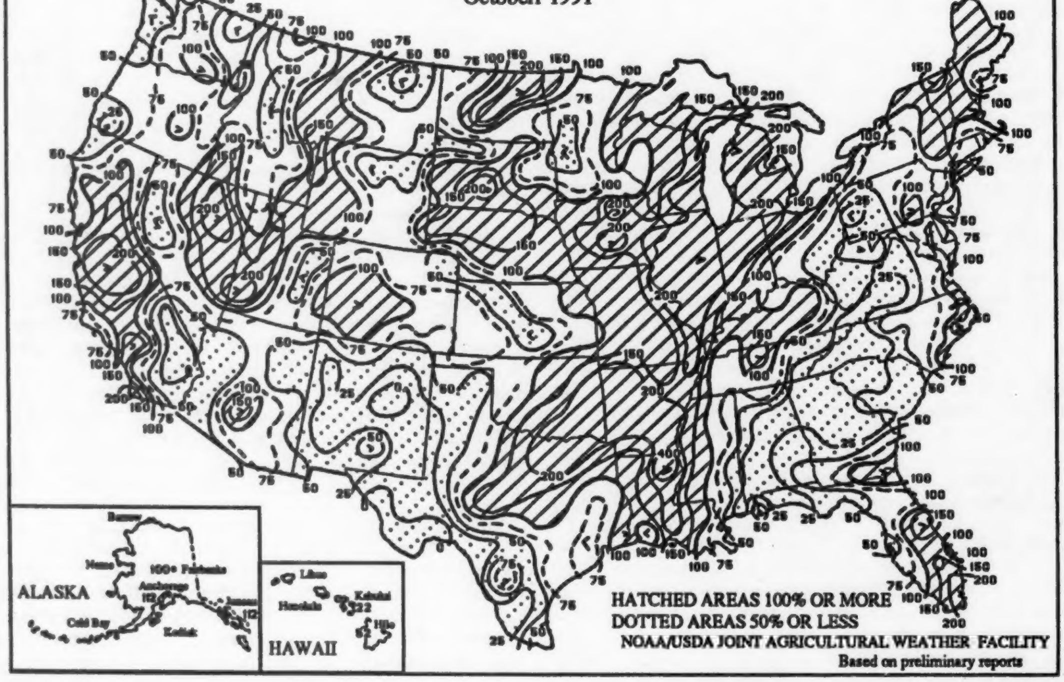
Miscellaneous records set during October included continuing strings of warmth in Milwaukee, WI (15 months in a row with above-normal temperatures), and Raleigh, NC (22 consecutive months). October rainfall in the lower Mississippi Valley pushed Shreveport, Minden, and Barksdale, LA, past record annual rainfall totals. The former records were set in 1957, 1946, and 1990, respectively, at the three locations. Minden's 1991 rainfall has reached 81.78 inches.

(From *Weekly Weather and Crop Bulletin* prepared and published by the NOAA/USDA Joint Agricultural Weather Facility)

TOTAL PRECIPITATION, INCHES
October 1991



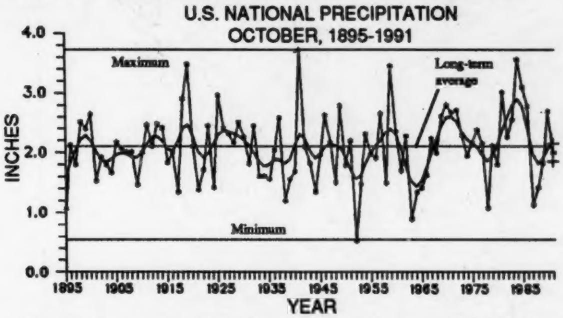
PERCENTAGE OF NORMAL PRECIPITATION
Octoberr 1991



(From *Weekly Weather and Crop Bulletin* prepared and published by the NOAA/USDA Joint Agricultural Weather Facility)

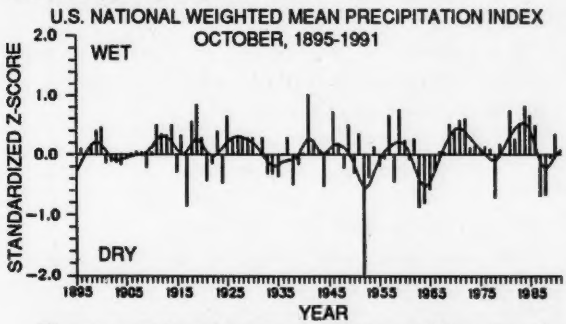
UNITED STATES OCTOBER CLIMATE IN HISTORICAL PERSPECTIVE

Preliminary data for October 1991 indicate that temperature averaged across the contiguous United States was slightly above the long-term mean. October 1991 ranked as the 57th coldest October on record. The 1991 value is based on preliminary data, which has been shown to be within 0.26 °F of the final data over a 31-month period. Roughly 12 percent of the country averaged much warmer than normal for October 1991, with only 5.6 percent averaging much cooler than normal.



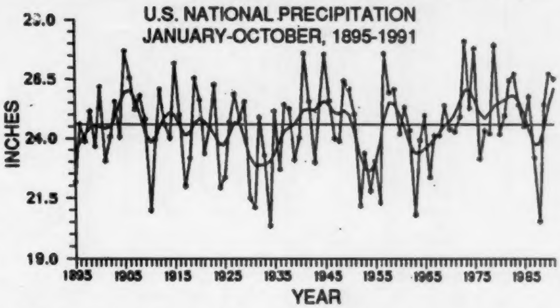
Areally-averaged precipitation for the nation was slightly below normal for October (graph above), ranking October 1991 as the 44th driest (54th wettest) October on record. The preliminary value for precipitation is estimated to be accurate to within 0.15 inches and the confidence interval is plotted above as a '+'. About one-tenth (10.9%) of the country experienced much wetter than normal conditions and 8.5% was much drier than normal.

Historical precipitation is shown in a different way in the graph below. The October precipitation for each climate division in the contiguous U.S. was first standardized using the gamma distribution over the 1951-80 period. These gamma-standardized values were then weighted by area and averaged to determine a national standardized precipitation value. Negative values are dry, positive are wetter than the mean. This index gives a more accurate indication of how precipitation across the country compares to the local normal climate. The areally-weighted mean standardized national precipitation ranks 1991 as the 36th driest (62nd wettest) October on record.

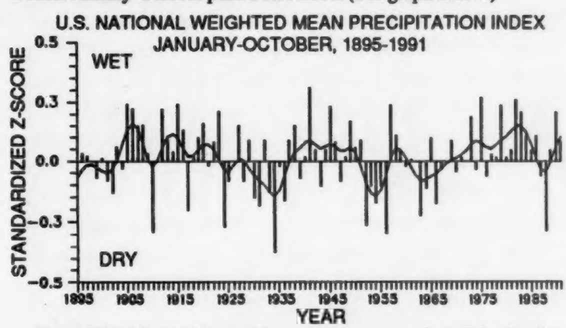


Temperatures showed a pattern of cooler conditions along the northern tier of states where the East North Central (29th coldest) and West North Central (21st coldest) regions ranked in the lower third of the historical distribution. On the other hand, the West region reported their eighth warmest (90th coldest) October on record putting them on the opposite extreme. The remainder of the country ranked toward the middle of the historical distribution. Precipitation rankings also varied significantly. The Northwest region recorded their tenth driest October ever while the East North Central recorded their 17th wettest October since records began in 1895. The Southeast had the sixteenth driest October on record with much of that thanks to a somewhat persistent high pressure ridge over the eastern third of the country for a good portion of the month. For the entire nation, October was dry and warm having the 44th driest and 41st warmest October since records began.

The year so far, for the nation as a whole, has been unusually warm, with January-October 1991 ranking as the ninth warmest January-October period on record. Nearly a third (29.1%) of the country has averaged very warm when compared to the normal while less than one percent of the country (0.6%) has averaged very cold thus far this year. Two states recorded their warmest January-October period on record (Connecticut and Maryland) while six other states have recorded their second warmest January through October period since records began.



For the nation, the period January-October 1991 shows areally-averaged precipitation well above normal (eleventh wettest) and comparable to those of the early 1970's. (See graph above.) When the local normal climate is taken into account, however, 1991 ranked as the 29th wettest January-October period on record. (See graph below.)

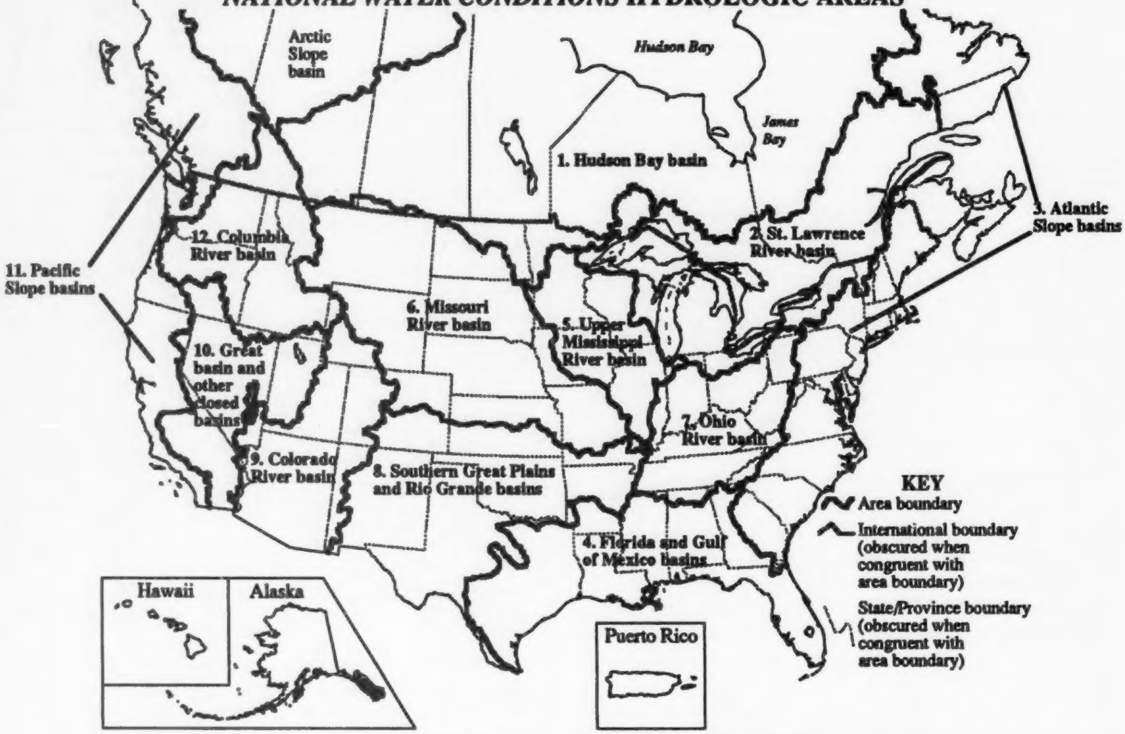


About 5% of the nation experienced below normal precipitation for the January through October period while about ten percent (11.2%) was much wetter than normal. For the ten-month period, January through October 1991, three states (Maryland, Pennsylvania, and West Virginia) had their seventh driest or drier year while Kansas and Ohio had their twelfth and tenth driest January-October period on record, respectively. Toward the other extreme, seven states had their tenth wettest or wetter January through October period on record, of which the period for Louisiana is the wettest on record.

Five River Basin areas (Great Basin, Upper Colorado, Upper Mississippi, Lower Mississippi, and Great Lakes) had 1991 rankings in the top third wettest of the distribution for the month of October. The wettest is the Upper Mississippi Basin which had the fifth wettest October on record. The Great Lakes Basin had the thirteenth wettest October on record while the Lower Mississippi Basin had the 17th wettest October since records began in 1895. On the other hand, the driest was the Pacific Northwest Basin which ranked tenth driest.

(From *Climate Variations Bulletin*, National Climatic Data Center, NOAA)

NATIONAL WATER CONDITIONS HYDROLOGIC AREAS



NEW BASE MAPS USED IN THE *NATIONAL WATER CONDITIONS*

The hydrologic areas map above is essentially that published on page 15 of the October 1990 *National Water Conditions* (NWC). The areas were modified from hydrologic units shown in U.S. Geological Survey Water-Supply Paper 2294, Hydrologic unit maps (1987), and basins shown in the Hydrologic atlas of Canada, Department of Fisheries and Environment (1978). The publication of this map in October 1990 (and the graphs which followed the map) was the beginning of an effort to develop a new base map of the conterminous United States and southern Canada for use in the NWC. The base map would be used to delineate streamflow conditions and reservoir storage, as well as show hydrologic areas.

The October 1989 NWC presented maps and tables showing the location, identification numbers, and names of all streamflow and reservoir index stations used in the NWC. The October 1990 NWC contained the statement "A location map and list of all streamflow index stations used in the NWC was published on pages 10-11 of the October 1989 NWC. Those pages will be republished using the base map shown above in a future issue of the NWC."

On the facing page are the locations of the NWC streamflow and reservoir index stations on the new base map. The two pages that follow the maps list updated tables for the streamflow and reservoir index stations. The map showing the location of streamflow index stations also shows the "northern limit for delineation of streamflow conditions in the conterminous United States and southern Canada." The limit is significantly different than that used previously, which resulted in a significant revision of the total area cited for the conterminous United States and southern Canada on page 3 of this issue and previous issues of the NWC—3,771,000 mi^2 as currently cited versus 4,499,900 mi^2 as used prior to this month.

All previously-published streamflow maps will be redrawn on the new base, using a common reference period, and republished by the U.S. Geological Survey (USGS). The "Streamflow conditions and reservoir storage during....... " maps for the coming year will all use the new base map.

The parameters for the new base map (which has four-kilometer resolution in the conterminous United States) of the conterminous United States and southern Canada are:

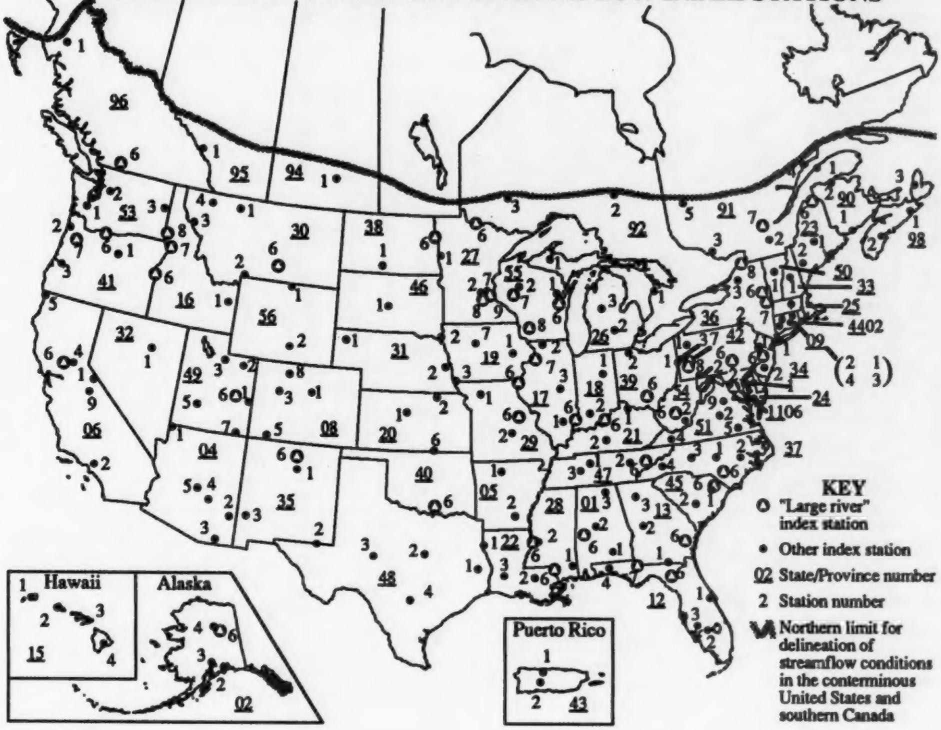
Projection: Albers equal area conic
Standard parallels: 29° 30' 00" north
45° 30' 00" north
Standard meridian: 96° 00' 00" west

Characteristics of this projection are: all areas on the map are proportional to the same areas on the earth; directions are reasonably accurate in limited regions; distances are true on both standard parallels; maximum scale error is 1.25 percent on a map of the conterminous United States with standard parallels of 29° 30' 00" north and 45° 30' 00" north; scale is true only along standard parallels.

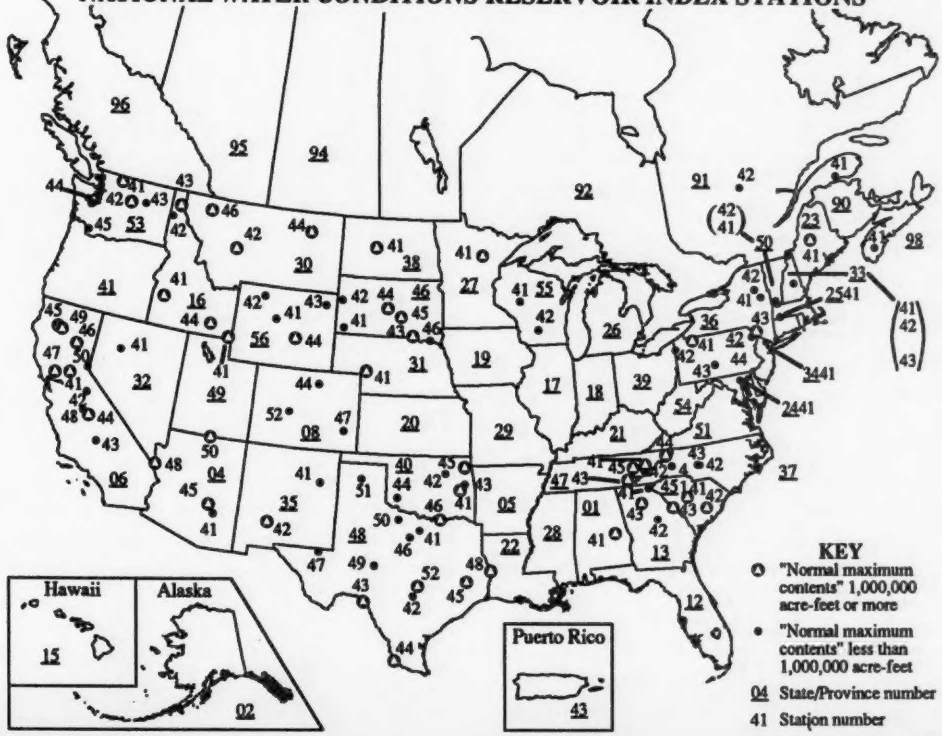
The maps of Alaska, Hawaii, and Puerto Rico are both new and also Albers Equal Area Conic projections.

The maps on page 26 of this issue were published in order to clear up any questions regarding the NWC staff's knowledge of world geography. The Robinson world map was modified from a commercially-purchased map art collection and the Orthographic map was modified from USGS digital line graph files.

NATIONAL WATER CONDITIONS STREAMFLOW INDEX STATIONS



NATIONAL WATER CONDITIONS RESERVOIR INDEX STATIONS



NATIONAL WATER CONDITIONS STREAMFLOW INDEX STATIONS

Station number NWC	Station number USGS	Stream name and location
0101	02371500	Conecuh River at Brantley, Alabama
0102	02424000	Cahaba River at Centreville, Alabama
0103	03574500	Paint Rock River near Woodville, Alabama
0106	02467000	Tombigbee River at Demopolis Lock & Dam near Coatopa, Alabama
0202	15258000	Kenai River at Cooper Landing, Alaska
0203	15290000	Little Susitna River near Palmer, Alaska
0204	15514000	Chena River at Fairbanks, Alaska
0206	15515500	Tanana River at Nenana, Alaska
0401	09415000	Virgin River at Littlefield, Arizona
0402	09448500	Gila River at Head of Safford Valley near Solomon, Arizona
0403	09471000	San Pedro River at Charleston, Arizona
0404	09498500	Salt River near Roosevelt, Arizona
0405	09508500	Verde River below Tangle Creek, above Horseshoe Dam, Arizona
0501	07056000	Buffalo River near St. Joe, Arkansas
0502	07363500	Saline River near Rye, Arkansas
0601	10296000	West Walker River below Little Walker River, near Coleville, California
0602	11098000	Arroyo Seco near Pasadena, California
0604	11427000	North Fork American River at North Fork Dam, California
0605	11532500	Smith River near Crescent City, California
0606	11425500	Sacramento River at Verona, California
0609	11264500	Merced River at Happy Isles Bridge, near Yosemite, California
0801	06710500	Bear Creek at Morrison, Colorado
0803	09085000	Roaring Fork River at Glenwood Springs, Colorado
0805	09361500	Animas River at Durango, Colorado
0808	09304500	White River near Meeker, Colorado
0901	01121000	Mount Hope River near Warrenville, Connecticut
0902	01188000	Burlington Brook near Burlington, Connecticut
0903	01193500	Salmon River near East Hampton, Connecticut
0904	01204000	Pomperaug River at Southbury, Connecticut
1106	01646500	Potomac River (adjusted) near Washington, District of Columbia
1201	02232500	St. Johns River near Christmas, Florida
1202	02256500	Fisheating Creek at Palmdale, Florida
1203	02296750	Peace River at Arcadia, Florida
1204	02369000	Shoal River near Crestview, Florida
1206	02320500	Suwannee River at Branford, Florida
1207	02358000	Apalachicola River at Chattahoochee, Florida
1301	02317500	Alapaha River at Statenville, Georgia
1302	02347500	Flint River near Culloden, Georgia
1303	02392000	Etowah River at Canton, Georgia
1306	02226000	Altamaha River at Doctortown, Georgia
1501	16068000	East Branch of North Fork Wailua River near Lihue, Kauai, Hawaii
1502	16229000	Kalihi Stream near Honolulu, Oahu, Hawaii
1503	16587000	Honopou Stream near Huelo, Maui, Hawaii
1504	16700000	Waiakea Stream near Mountain View, Hawaii, Hawaii
1601	13037500	Snake River (adjusted) near Heise, Idaho
1606	13269000	Snake River at Weiser, Idaho
1607	13317000	Salmon River at White Bird, Idaho
1608	13342500	Clearwater River (adjusted) at Spalding, Idaho
1701	03380500	Skillet Fork at Wayne City, Illinois
1702	05435500	Pecatonica River at Freeport, Illinois
1703	05572000	Sangamon River at Monticello, Illinois
1706	03377500	Wabash River at Mount Carmel, Illinois
1707	05446500	Rock River near Joslin, Illinois
1801	03326500	Mississinewa River at Marion, Indiana
1802	03373500	East Fork White River at Shoals, Indiana
1901	05464500	Cedar River at Cedar Rapids, Iowa
1902	06485500	Big Sioux River at Akron, Iowa
1903	06810000	Nishnabotna River above Hamburg, Iowa
1906	05474500	Mississippi River at Keokuk, Iowa
1907	05480500	Des Moines River at Fort Dodge, Iowa
2001	06867000	Saline River near Russell, Kansas
2002	06884400	Little Blue River near Barnes, Kansas
2006	07146500	Arkansas River at Arkansas City, Kansas
2101	03253500	Licking River (adjusted) at Catawba, Kentucky
2102	03308500	Green River at Munfordville, Kentucky
2106	03294500	Ohio River at Louisville, Kentucky
2201	07352000	Saline Bayou near Lucky, Louisiana
2202	07378500	Amite River near Denham Springs, Louisiana
2203	08013500	Calcasieu River near Oberlin, Louisiana
2206	02489500	Pearl River near Bogalusa, Louisiana
2301	01031500	Piscataquis River near Dover-Foxcroft, Maine
2302	01057000	Little Androscoggin River near South Paris, Maine
2306	01014000	St. John River below Fish River at Fort Kent, Maine
2401	01491000	Choptank River near Greensboro, Maryland
2402	01645000	Seneca Creek at Dawsonville, Maryland
2501	01173000	Ware River (adjusted) at Intake Works near Barre, Massachusetts
2601	04040500	Sturgeon River near Sidnaw, Michigan
2602	04112500	Red Cedar River at East Lansing, Michigan
2603	04121500	Muskegon River at Evart, Michigan
2701	05062000	Buffalo River near Dilworth, Minnesota
2702	05280000	Crow River at Rockford, Minnesota
2706	05133500	Rainy River at Manitou Rapids, Minnesota
2707	05288500	Mississippi River near Anoka, Minnesota
2708	05330000	Minnesota River near Jordan, Minnesota
2709	05331000	Mississippi River at St. Paul, Minnesota
2801	02479000	Pascagoula River at Merrill, Mississippi
2802	07290000	Big Black River near Bovina, Mississippi
2806	07289000	Mississippi River at Vicksburg, Mississippi
2901	06897500	Grand River near Gallatin, Missouri
2902	06933500	Gasconade River at Jerome, Missouri
2906	06934500	Missouri River at Hermann, Missouri
3001	06099500	Marias River near Shelby, Montana
3002	06191500	Yellowstone River at Corwin Springs, Montana
3003	12354500	Clark Fork at St. Regis, Montana
3004	12358500	Middle Fork Flathead River near West Glacier, Montana
3006	06214500	Yellowstone River at Billings, Montana

Station number NWC	Station number USGS	Stream name and location
3101	06454500	Niobrara River above Box Butte Reservoir, Nebraska
3102	06800500	Elkhorn River at Waterloo, Nebraska
3201	10322500	Humboldt River at Palisade, Nevada
3301	01076500	Pemigewasset River at Plymouth, New Hampshire
3401	01396500	South Branch Raritan River near High Bridge, New Jersey
3402	01411000	Great Egg Harbor River at Folsom, New Jersey
3406	01463500	Delaware River at Trenton, New Jersey
3501	08378500	Pecos River near Pecos, New Mexico
3502	08408500	Delaware River near Red Bluff, New Mexico
3503	09430500	Gila River near Gila, New Mexico
3506	08276500	Rio Grande below Taos Junction Bridge, near Taos, New Mexico
3601	01309500	Massapequa Creek at Massapequa, New York
3602	01503000	Susquehanna River at Conklin, New York
3603	04262500	West Branch Oswegatchie River near Harrisville, New York
3606	01318500	Hudson River at Hadley, New York
3607	01357500	Mohawk River at Cohoes, New York
3608	04264331	St. Lawrence River at Cornwall, Ontario, near Massena, New York
3701	02102000	Deep River at Moncure, North Carolina
3702	02091500	Contentnea Creek at Hookerton, North Carolina
3703	02118000	South Yadkin River near Mocksville, North Carolina
3704	03451500	French Broad River at Asheville, North Carolina
3706	02105500	Cape Fear River at William O. Huske Lock near Tarheel, North Carolina
3801	06354000	Cannonball River at Breien, North Dakota
3806	05082500	Red River of the North at Grand Forks, North Dakota
3901	03109500	Little Beaver Creek near East Liverpool, Ohio
3902	04193500	Maumee River at Waterville, Ohio
3906	03234500	Scioto River at Higby, Ohio
4006	07331000	Washita River near Dickson, Oklahoma
4101	14046500	John Day River at Service Creek, Oregon
4102	14301500	Wilson River near Tillamook, Oregon
4103	14321000	Umpqua River near Elkton, Oregon
4106	14105700	Columbia River (adjusted) at The Dalles, Oregon
4107	14191000	Willamette River (adjusted) at Salem, Oregon
4201	03020500	Oil Creek at Rouseville, Pennsylvania
4202	03079000	Casselman River at Markleton, Pennsylvania
4203	03106000	Connoquenessing Creek near Zelienople, Pennsylvania
4206	01570500	Susquehanna River at Harrisburg, Pennsylvania
4207	03049500	Allegheny River (adjusted) at Natrona, Pennsylvania
4208	03085000	Monongahela River (adjusted) at Braddock, Pennsylvania
4301	50038100	Rio Grande De Manati at Highway 2 near Manati, Puerto Rico
4302	50112500	Rio Inabon at Real Abajo, Puerto Rico
4402	01117500	Pawcatuck River at Wood River Junction, Rhode Island
4501	02132000	Lynches River at Effingham, South Carolina
4502	02173500	North Fork Edisto River at Orangeburg, South Carolina
4506	02131000	Pee Dee River at Peedee, South Carolina
4601	06441500	Bad River near Fort Pierre, South Dakota
4701	03434500	Harpeth River near Kingston Springs, Tennessee
4702	03540500	Emory River at Oakdale, Tennessee
4703	03604500	Buffalo River near Lobelville, Tennessee
4706	03469000	French Broad River (adjusted) below Douglas Dam, Tennessee
4801	08033500	Neches River near Rockland, Texas
4802	08095000	North Bosque River near Clifton, Texas
4803	08134000	North Concho River near Carlsbad, Texas
4804	08167500	Guadalupe River near Spring Branch, Texas
4901	09180500	Colorado River near Cisco, Utah
4902	09299500	Whiterocks River near Whiterocks, Utah
4903	10128500	Weber River near Oakley, Utah
4905	10234500	Beaver River near Beaver, Utah
4906	09315000	Green River at Green River, Utah
4907	09379500	San Juan River near Bluff, Utah
5001	04287000	Dog River at Northfield Falls, Vermont
5102	02030500	Slate River near Arvonia, Virginia
5104	03488000	North Fork Holston River near Saltville, Virginia
5105	02051500	Meherrin River near Lawrenceville, Virginia
5109	01664000	Rappahannock River at Remington, Virginia
5301	12027500	Chehalis River near Grand Mound, Washington
5302	12134500	Skykomish River near Gold Bar, Washington
5303	12422500	Spokane River (adjusted) at Spokane, Washington
5401	01610000	Potomac River at Paw Paw, West Virginia
5402	03183500	Greenbrier River at Alderson, West Virginia
5406	03193000	Kanawha River at Kanawha Falls, West Virginia
5501	04071000	Oconto River near Gillett, Wisconsin
5502	05362000	Jump River at Sheldon, Wisconsin
5506	04084500	Fox River at Rapide Croche Dam, near Wrightstown, Wisconsin
5507	05365500	Chippewa River at Chippewa Falls, Wisconsin
5508	05407000	Wisconsin River at Muscoda, Wisconsin
5601	06298000	Tongue River near Dayton, Wyoming
5602	06630000	North Platte River above Seminoe Reservoir near Sinclair, Wyoming
9001	01AQ001	Lepreau River at Lepreau, New Brunswick
9002	01BE001	Upsalquitch River at Upsalquitch, New Brunswick
9101	02QB001	Matane River near Matane, Quebec
9102	02OF002	St. Francois River at Hemmings Falls, Quebec
9103	02KG001	Coulonge River near Fort Coulonge, Quebec
9104	02TE001	Outardes River at Outardes Falls, Quebec
9105	04NA001	Harricana River at Amos, Quebec
9107	02NG001	St. Maurice River at Grand Mere, Quebec
9201	02FC001	Saugeen River near Port Elgin, Ontario
9202	04LJ001	Missinaibi River at Mattice, Ontario
9203	05QA002	English River at Umfreville, Ontario
9401	05JF001	Qu'Appelle River near Lumsden, Saskatchewan
9501	05BB001	Bow River at Banff, Alberta, Canada
9601	08EF001	Skeena River at USK, British Columbia
9606	08MF005	Fraser River at Hope, British Columbia
9801	01EO001	St. Mary's River at Stillwater, Nova Scotia
9802	01EF001	La Have River at West Northfield, Nova Scotia
9803	01FB001	Northeast Margaree River at Margaree Valley, Nova Scotia

NATIONAL WATER CONDITIONS RESERVOIR INDEX STATIONS

The usable storage capacity of each reservoir is shown in the column headed "Normal maximum"

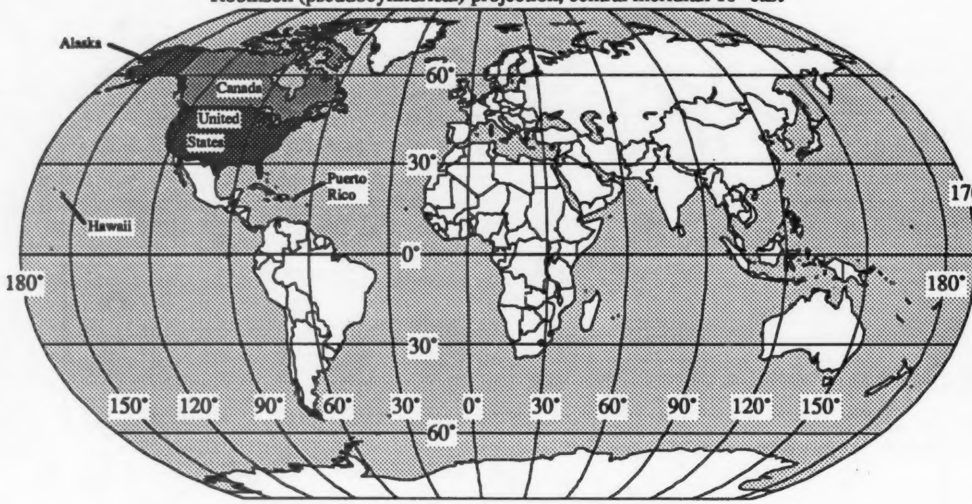
Station identification number		PROVINCE, STATE, OR AREA	Principal uses: F-Flood control, I-Irrigation, M-Municipal, P-Power, R-Recreation, W-Industrial						Normal maximum
NWC	USGS	Reservoir or System	F	I	M	P	R	W	(acre-feet)[a]
		NOVA SCOTIA							
9841		Rossignol, Mulgrave, Falls Lake, St. Margaret's Bay, Black, and Pockbook Reservoirs				X			[b]226,300
		QUEBEC							
9141		Allard				X			280,600
9142		Gouin				X			6,954,000
		MAINE							
2341	01127000	Seven Reservoir Systems			X	X			4,107,000
		NEW HAMPSHIRE							
3341	01127850	First Connecticut Lake				X			76,450
3342	01129000	Lake Francis	X			X	X		99,310
3343	01080000	Lake Winnipesaukee				X	X		165,700
		VERMONT							
5041	01168000	Harriman				X			116,200
5042	01167490	Somerset				X			57,390
		MASSACHUSETTS							
2541	01182500	Cobble Mountain and Borden Brook			X	X			77,920
		NEW YORK							
3641	01323500	Great Sacandaga Lake	X			X	X		786,700
3642	01314500	Indian Lake	X		X	X			103,300
3643	01416900	New York City Reservoir System			X			X	1,680,000
		NEW JERSEY							
3441	01386990	Wanaque			X				85,100
		PENNSYLVANIA							
4241	03012550	Allegheny	X			X	X		1,180,000
4242	03310050	Pymatuning	X		X		X		188,000
4243	01563100	Raystown Lake	X				X		761,900
4244	01431700	Lake Wallenpaupack				X	X		157,800
		MARYLAND							
2441	01589000	Baltimore Municipal System			X				261,900
		NORTH CAROLINA							
3741	02138519	Bridgewater (Lake James)				X			288,800
3742	02122844	Narrows (Badin Lake)				X			128,900
3743	02122400	High Rock Lake				X			234,800
		SOUTH CAROLINA							
4541	02168500	Lake Murray				X			1,614,000
4542	02171000	Lakes Marion and Moultrie				X			1,777,000
		SOUTH CAROLINA-GEORGIA							
4543	02194500	Strom Thurmond Lake	X			X			1,730,000
		GEORGIA							
1341	02178500	Burton				X	X		104,000
1342	02222500	Sinclair			X	X	X		214,000
1343	02334400	Lake Sidney Lanier	X		X	X	X		1,686,000
		ALABAMA							
0141	02417500	Lake Martin				X			1,375,000
		TENNESSEE VALLEY							
4741	03532500	Clinch Projects: Norris and Melton Hill Lakes	X			X	X		2,293,000
4742	03468500	Douglas Lake	X			X	X		1,395,000
4743	03554500	Hiwassee Projects: Chatuge, Nottely, Hiwassee, Apalachia, Blue Ridge, Ocoee 3, and Parksville Lakes	X			X	X		1,012,000
4744	03493500	Holston Projects: South Holston, Watauga, Boone, Fort Patrick Henry, and Cherokee Lakes	X			X	X		2,880,000
4745	03514500	Little Tennessee Projects: Nantahala, Thorpe, Fontana, and Chilhowee Lakes	X			X	X		1,478,000
		WISCONSIN							
5541	05355600	Chippewa and Flambeau				X	X		365,000
5542	05401400	Wisconsin River (21 Reservoirs)				X	X		399,000
		MINNESOTA							
2741	05201000	Mississippi River Headwater System	X		X		X		1,640,000
		NORTH DAKOTA							
3841	06338000	Lake Sakakawea (Garrison)	X	X		X	X		22,700,000
		SOUTH DAKOTA							
4641	06401000	Angostura		X					130,770
4642	06435000	Belle Fourche		X					185,200
4643	06452500	Lake Francis Case	X	X		X			4,589,000
4644	06439980	Lake Oahe	X	X		X			22,240,000
4645	06444270	Lake Sharpe	X	X		X			1,697,000
4646	06467000	Lewis and Clark Lake	X	X		X			432,000
		NEBRASKA							
3141	0669000	Lake McConaughy		X		X			1,948,000
		OKLAHOMA							
4041	07244800	Eufaula	X			X	X		2,378,000
4042	07164200	Keystone	X			X	X		661,000
4043	07197500	Tenkiller Ferry	X			X	X		628,200
4044	07302500	Lake Altus	X	X	X		X		133,000
4045	07190000	Lake O'The Cherokees	X			X	X		1,492,000
		OKLAHOMA-TEXAS							
4046	07331500	Lake Texoma	X		X	X	X	X	2,722,000
		TEXAS							
4841	08043000	Bridgeport		X	X			X	386,400
4842	08167700	Canyon	X		X		X		385,600
4843	08450800	International Amistad	X	X	X	X		X	3,497,000
4844	08461200	International Falcon	X	X	X	X		X	2,668,000
4845	08066191	Livingston		X	X			X	1,788,000
4846	08088500	Possum Kingdom		X	X	X	X	X	570,200
4847	08410000	Red Bluff		X		X			307,000
4848	08025350	Toledo Bend				X			4,472,000
4849	08131200	Twin Buttes	X	X	X				177,800
4850	07312000	Lake Kemp		X	X			X	268,000
4851	07227900	Lake Meredith	X		X			X	796,900
4852	08154500	Lake Travis	X	X	X	X	X	X	1,144,000
		MONTANA							
3042	06058500	Canyon Ferry	X	X	X	X	X		2,043,000
3044	06131500	Fort Peck	X			X	X		18,910,000
3046	12362000	Hungry Horse	X	X		X	X		3,451,000
		WASHINGTON							
5341	12175000	Ross				X	X		1,052,000
5342	12436000	Franklin D. Roosevelt Lake		X		X			5,022,000
5343	12452000	Lake Chelan				X	X		676,100
5344	12057000	Lake Cushman				X	X		359,500
5345	14220000	Lake Merwin				X			245,600
		IDAHO							
1641	13190000	Boise River (4 Reservoirs)	X	X		X			1,235,000
1642	12415500	Coeur d'Alene Lake				X			238,500
1643	12392500	Pend Oreille Lake	X			X			1,561,000
		IDAHO-WYOMING							
1644	13076500	Upper Snake River (8 Reservoirs)			X	X			4,401,000
		WYOMING							
5641	06258900	Boysen	X	X		X			802,000
5642	06281500	Buffalo Bill		X		X			421,300
5643	06427000	Keyhole	X						193,800
5644	06635500	Pathfinder, Seminoe, Alcova, Kortes, Glendo, and Guernsey Reservoirs		X					3,056,000
		COLORADO							
0847	07130000	John Martin	X	X			X		364,400
0852	09108500	Taylor Park		X			X		106,200
0844	09018500	Colorado-Big Thompson Project		X					730,300
		COLORADO RIVER STORAGE PROJECT							
0850	09379900	Lake Powell; Flaming Gorge, Fontenelle, Navajo, and Blue Mesa Reservoirs	X	X		X	X		31,620,000
		UTAH-IDAHO							
4941	10055500	Bear Lake		X		X	X		1,421,000
		CALIFORNIA							
0641	11446200	Folsom Lake	X	X	X	X	X		1,000,000
0642	11275500	Hetch Hetchy			X	X			360,400
0643	11190500	Lake Isabella	X	X			X		568,100
0644	11221000	Pine Flat Lake	X	X			X		1,001,000
0645	11525400	Clair Engle Lake (Lewiston)	X			X			2,438,000
0646	11399000	Lake Almanor				X	X		1,036,000
0647	11453900	Lake Berryessa	X	X	X		X	X	1,600,000
0648	11250100	Millerton Lake	X	X					503,200
0649	11370000	Shasta Lake	X	X		X	X		4,377,000
		CALIFORNIA-NEVADA							
0650	10337000	Lake Tahoe		X	X	X	X	X	744,600
		NEVADA							
3241	10334500	Rye Patch		X					194,300
		ARIZONA-NEVADA							
0448	09421000	Lake Mead and Lake Mohave	X	X	X	X			27,970,000
		ARIZONA							
0441	09469000	San Carlos		X		X			935,100
0445	09501000	Salt and Verde River System		X	X	X	X		2,019,100
		NEW MEXICO							
3541	07223500	Conchas	X	X			X		315,700
3542	08360500	Elephant Butte and Caballo	X	X		X	X		2,394,000

[a]1 acre-foot = 0.04356 million cubic feet = 0.326 million gallons = 0.504 cubic feet per second per day.

[b]Thousands of kilowatt-hours (the potential electric power that could be generated by the volume of water in storage).

WHERE IN THE WORLD IS THE *NATIONAL WATER CONDITIONS*?

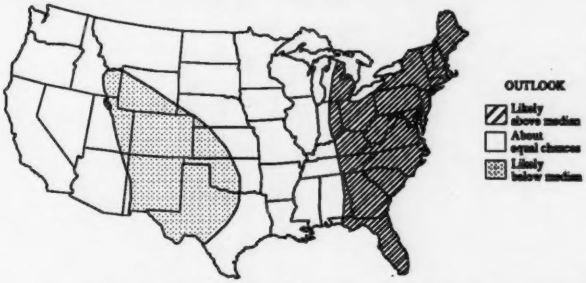
Robinson (pseudocylindrical) projection, central meridian 10° east



A LITTLE "CLOSER" VIEW OF THE WORLD

Orthographic projection from an altitude of 100,000 kilometers above 110° west 40° north

TEMPERATURE OUTLOOK FOR NOVEMBER 1991-JANUARY 1992



PRECIPITATION OUTLOOK FOR NOVEMBER 1991-JANUARY 1992

From *Monthly and Seasonal Weather Outlook* prepared and published by the National Weather Service

NATIONAL WATER CONDITIONS

OCTOBER 1991

Based on reports from the Canadian and U.S. Field offices; completed December 11, 1991

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EXPLANATION OF DATA (Revised December 1990)

Cover map shows generalized pattern of streamflow for the month based on provisional data from 186 index gaging stations—18 in Canada, 166 in the United States, and 2 in the Commonwealth of Puerto Rico. Alaska, Hawaii, and Puerto Rico inset maps show streamflow only at the index gaging stations that are located near the point shown by the arrows. Classifications on map are based on comparison of streamflow for the current month at each index station with the flow for the same month in the 30-year reference period, 1951-80. Shorter reference periods are used for one Canadian index station, two Kansas index stations, and the Puerto Rico index stations because of the limited records available.

The ***streamflow ranges map*** shows where streamflow has persisted in the above- or below-normal range from last month to this month and also where streamflow is in the above- or below-normal range this month after being in a different range last month. Three ***pie charts*** show: the percent of stations reporting discharges in each flow range for both the conterminous United States and southern Canada, and also the percent of area in each flow range for the conterminous United States and southern Canada. The ***combination bar/line graph*** shows the percent departure of the total mean from the total median flow (1951-80) and the cumulative departure from median (in cfs) for all reporting stations (excluding eight large river stations indicated by * in the ***Flow of large rivers*** table) in the conterminous United States and southern Canada.

The comparative data are obtained by ranking the 30 flows for each month of the reference period in order of decreasing magnitude—the highest flow is given a ranking of 1 and the lowest flow is given a ranking of 30. Quartiles (25-percent points) are computed by averaging the 7th and 8th highest flows (upper quartile), 15th and 16th highest flows (middle quartile and median), and the 23rd and 24th highest flows (lower quartile). The upper and lower quartiles set off the highest and lowest 25 percent of flows, respectively, for the reference period. The median (middle quartile) is the middle value by definition. For the reference period, 50 percent of the flows are greater than the median, 50 percent are less than the median, 50 percent are between the upper and lower quartiles (in the normal range), 25 percent are greater than the upper quartile (above normal), and 25 percent are less than the lower quartile (below normal). Flow for the current month is then classified as: in the ***above-normal range*** if it is greater than the upper quartile, in the ***normal range*** if it is between the upper and lower quartiles, and in the ***below-normal range*** if it is less than the lower quartile. Change in flow from the previous month to the current month is classified as ***seasonal*** if the change is in the same direction as the change in the median. If the change is in the opposite direction of the change in the median, the change is classified as ***contraseasonal*** (opposite to the seasonal change). For example: at a particular index station, the January median is greater than the December median; if flow for the current January increased from December (the previous month), the increase is seasonal; if flow for the current January decreased from December, the decrease is contraseasonal.

Flood frequency analyses define the relation of flood peak magnitude to probability of occurrence or recurrence interval. ***Probability of occurrence*** is the chance that a given flood magnitude will be exceeded in any one year. ***Recurrence interval*** is the reciprocal of probability of occurrence and is the average number of years between occurrences. For example, a flood having a probability of occurrence of 0.01 (1 percent) has a recurrence interval of 100 years. ***Recurrence intervals imply no regularity of occurrence***; a 100-year flood might be exceeded in consecutive years or it might not be exceeded in a 100-year period.

Statements about ***ground-water levels*** refer to conditions near the end of the month. The water level in each observation well is compared with average level for the end of the month determined from the entire period of record for that well. ***Changes in ground-water levels***, unless described otherwise, are from the end of the previous month to the end of the current month.

Dissolved solids and temperature data are given for five stream-sampling sites that are part of the National Stream Quality Accounting Network (NASQAN). ***Dissolved solids*** are minerals dissolved in water and usually consist predominately of silica and ions of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, chloride, and nitrate. ***Dissolved-solids discharge*** represents the total daily amount of dissolved minerals carried by the stream. ***Dissolved-solids concentrations*** are generally higher during periods of low streamflow, but the highest dissolved-solids discharges occur during periods of high streamflow because the total quantities of water, and therefore total load of dissolved minerals, are so much greater than at times of low flow.

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